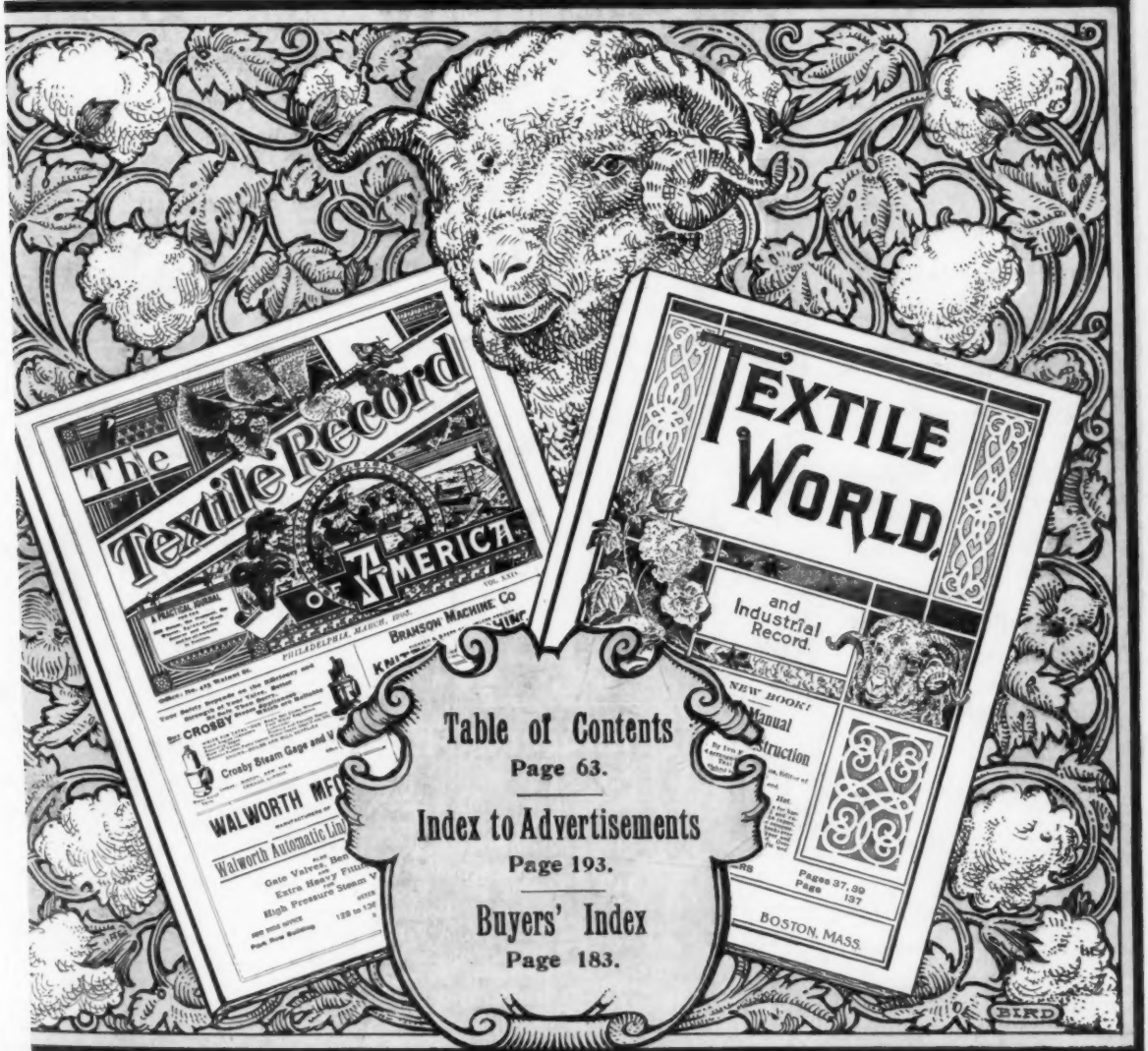
olume XXVIII.
umber 1.

OCTOBER, 1904.

$2.00 per year.
$3.00 with Directory.

TEXTILE WORLD RECORD



LORD & NAGLE COMPANY · Boston & Philadelphia

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ort of the Fall Meeting of N. E. Cotton Manufacturers' Ass'n is Contained in this Number

The Textile-Finishing Machinery Co.

17 EXCHANGE PLACE, PROVIDENCE, R. I.

Mercerizing Machinery for Piece Goods and Yarn in the warp or chain

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

Rusden Patent

Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

BUILDERS OF ALL KINDS OF

MACHINERY

FOR

BLEACHING

DYEING

DRYING

AND

FINISHING

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Patent Combination Rolls made of Cotton and Husk especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

Padding and Drying Machines for Shade Cloths.

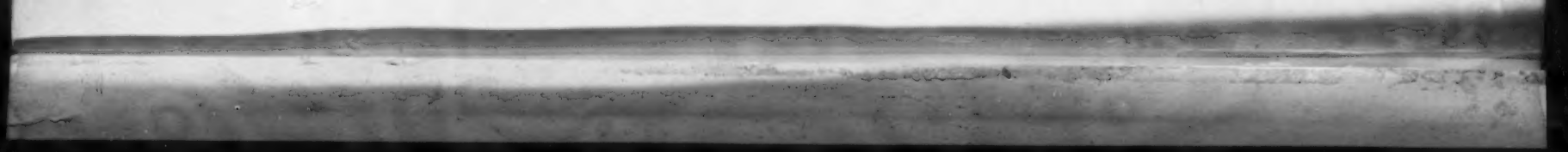
Single and Double Cylinder Engines.

Hydraulic Presses and Pumps.

ALL KINDS OF OUTFITS FOR BLEACHING THREAD AND SOFT TWISTED YARN.
BLEACHING MACHINERY FOR YARNS IN THE WARP OR CHAIN.

Estimates, drawings and full particulars of complete plants furnished on application

Southern Agent, STUART W. CRAMER, Trust Bldg., Charlotte, N. C., Equitable Bldg., Atlanta, Ga.

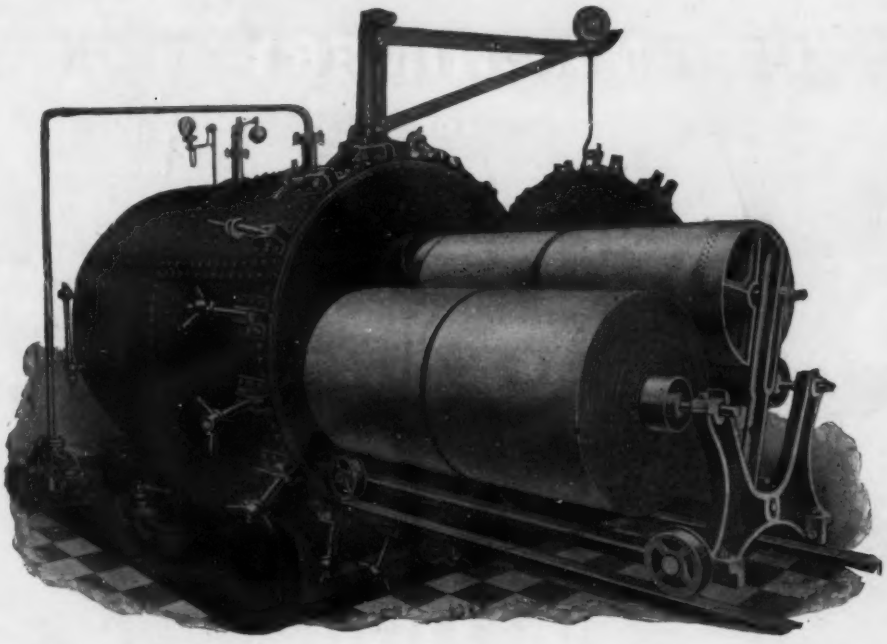


Open Bleaching System

OF

JACKSON & HUNT

Patented in the United States, Great Britain and the Continent
U. S. Patent, January 15th, 1901. No. 666,056



H. W. Butterworth & Sons Co.

Manufacturers of

Bleaching, Dyeing, Drying and Finishing Machinery

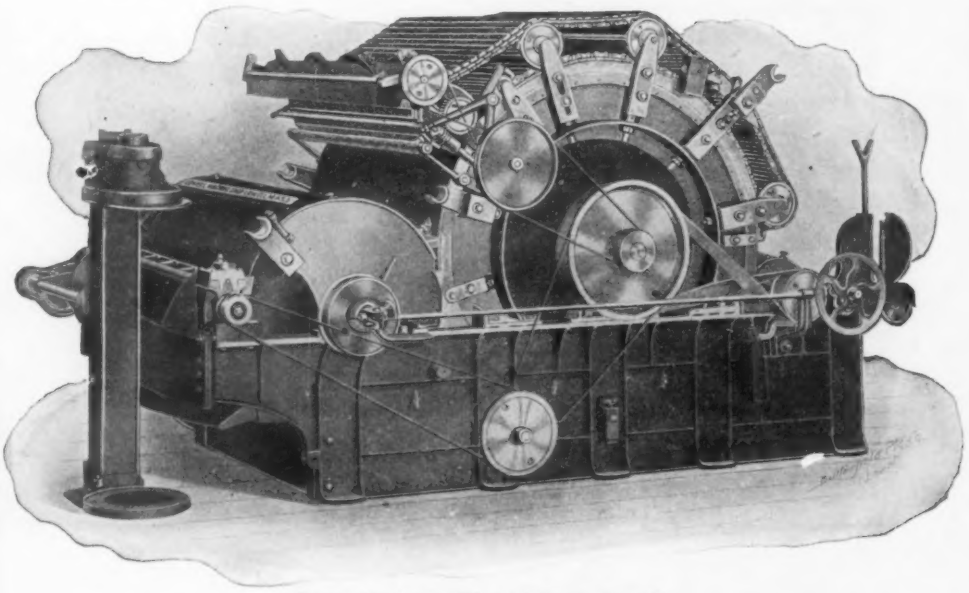
YORK AND CEDAR STREETS

PHILADELPHIA

Sole Makers for the United States

Cotton and Worsted Machinery

OF EVERY DESCRIPTION



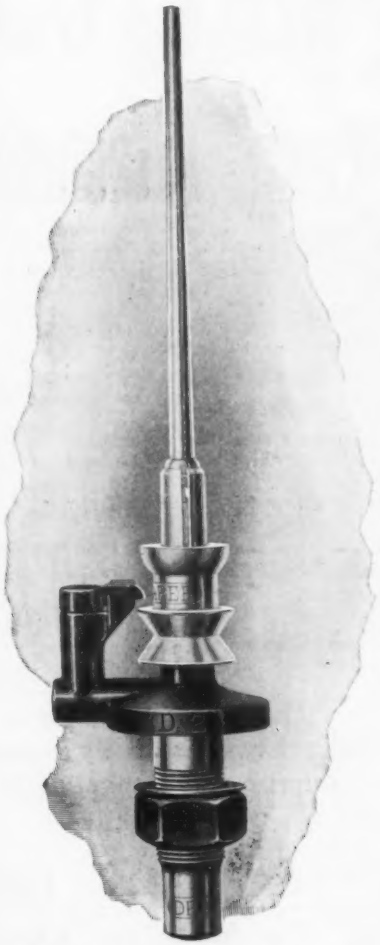
Revolving Flat Top Card.

Simple in Design and Construction. Durable in Operation. Maximum Carding with Minimum Waste. Improvements are added only after several years' trial, thus saving our customers and ourselves many annoyances which others have experienced. Workmanship a Leading Characteristic.

Lowell Machine Shop

LOWELL, MASS.

A New Spindle Improvement



The Rabbeth Centrifugal Bobbin Clutch.

Fits the Bobbin loosely when at rest—allows considerable variation in fit.

Bobbins will all go down into place and Traverse can be lengthened.

Allows easier and quicker doffing — stronger bobbins — less reaming.

Draper Company, Hopedale, Mass.

We Also Build Looms.

We beg to inform the trade that our

Automatic Shuttle and Loom Attachment

Can be seen in operation on Cotton, Silk and Worsted Looms of different makes. An inspection of these looms will convince every manufacturer of the following

GREAT ADVANTAGES:

1. Our device can be put on any modern Cotton, Silk or Worsted Loom.
2. Our shuttles change on the pick while the loom is running at regular speed and absolutely *leave no broken picks.*
3. It *does not affect the speed* of the loom at any time.
4. Our attachment is so *very simple* that it needs no more care than an ordinary loom and there is *no intricate mechanism* in our attachment which is liable to come out of order.
5. A weaver can attend, without extra exertion, to a *greater number of looms* with our device than with an ordinary loom.
6. It thus enables the weaver to earn *more wages.*
7. It is *time saving* and gives an *increase in the production* which is very considerable.
8. It reduces the manufacturing expenses *to a large extent.*
9. *Waste* on the quills is *reduced* to almost nothing.
10. As the loom stops less frequently, its operation is more regular, consequently producing *better* goods and also keeping the *looms in better condition.*

The superiority of our Automatic Shuttle and Loom Attachment over all existing similar devices is its simplicity and the fact that it absolutely leaves no mispicks whatsoever, which has been a cause of surprise and admiration to all experts who have seen our Attachment in operation.

We Guarantee Our Automatic Shuttle and Loom Attachment to Do Exactly What We Mention Above.

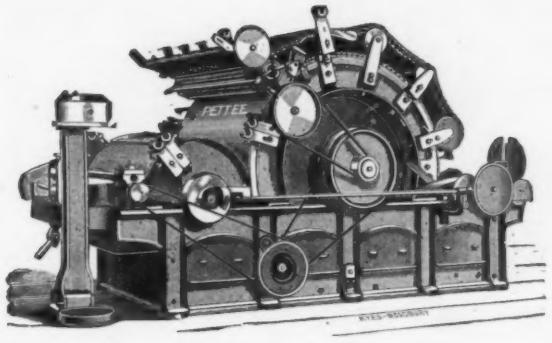
For Inspection, please communicate with our office,
415 BROADWAY, NEW YORK.
Works, Slatington, Pa.

THE ASALA COMPANY.

Saco and Pettee Machine Shops

NEWTON UPPER FALLS, MASS., U. S. A.

COTTON MACHINERY



PICKERS,
REVOLVING FLAT CARDS,
DRAWING FRAMES,
RAILWAY HEADS,

SLUBBING,
INTERMEDIATE AND ROVING FRAMES,
SPINNING FRAMES,

SPOOLERS AND REELS.

Shops: { **Biddeford, Me.**
Newton Upper Falls, Mass.

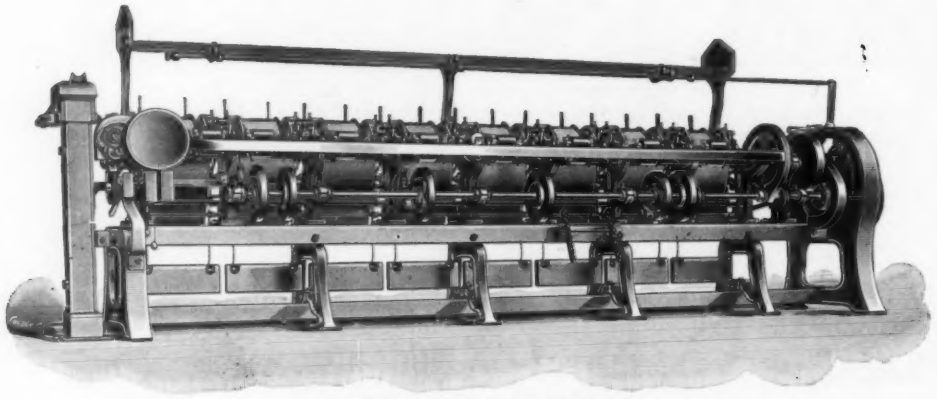
Southern Agent, A. H. WASHBURN, Charlotte, N. C.

THE

WHITIN MACHINE WORKS,

Cotton Machinery

WHITINSVILLE, MASS.



The Whitin 8 Head Comber.

Southern Agent, . . . S. W. CRAMER

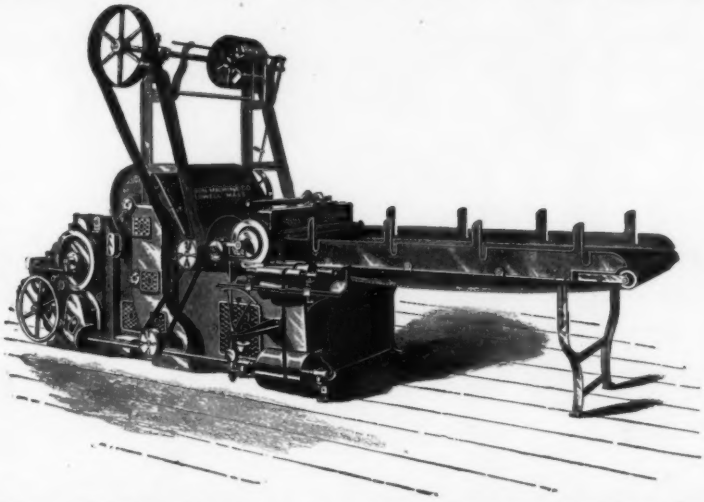
Trust Building, CHARLOTTE, N. C.
and Equitable Bldg, ATLANTA, GA.

Revolving Flat Carding Engines,
Sliver Lap Machines,
Ribbon Lap Machines,
Combers,
Railway Heads,
Drawing Frames,

Spinning Frames,
Spoolers,
Twisters,
Reels,
Looms,
Long Chain Quilling Machines.

The Best Pickers

In the Cotton Field nothing equals the DARKY COTTON PICKERS.



In the Cotton Mill nothing equals the KITSON COTTON PICKERS.

KITSON MACHINE CO., LOWELL, MASS.

LARGEST BUILDERS OF COTTON OPENERS AND LAPPERS IN THE WORLD.

STUART W. CRAMER, Southern Agt., Charlotte, N. C. and Equitable Bldg., Atlanta, Ga.

SCOTT & WILLIAMS

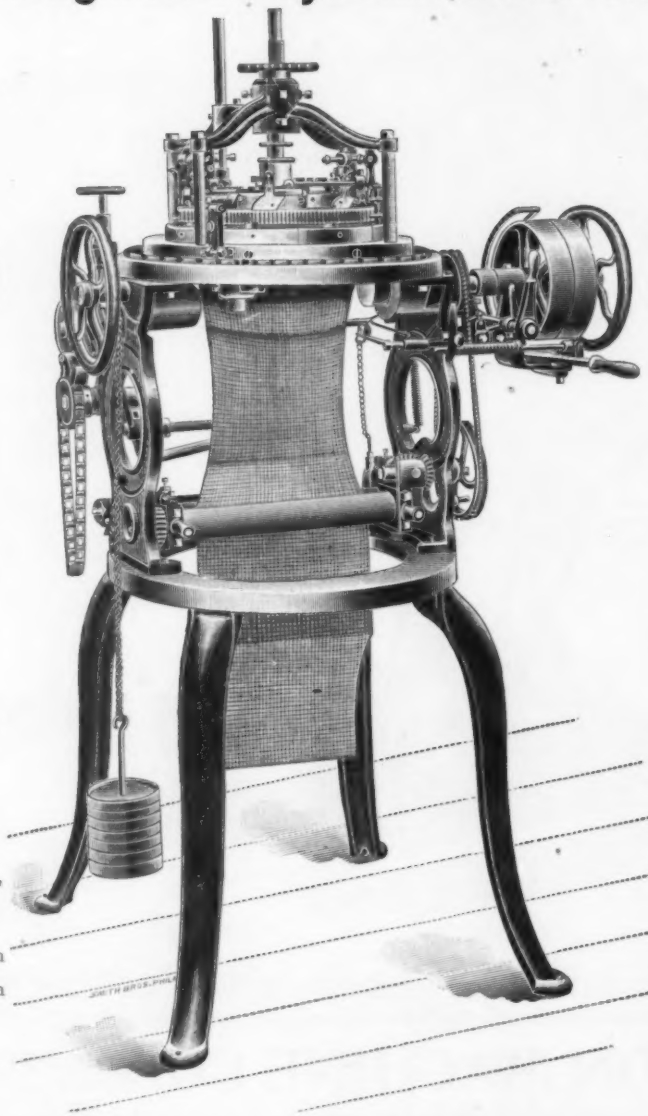
BUILDERS OF

Rib Knitting Machinery for Underwear and Hosiery

The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.



Plain, Single Lever or with Welt, Slack Course and Automatic Slackening Device for Welt.

Improved Measuring Device, by actual length knit.

Sizes, 8 to 24 inches, inclusive, varying by one inch.

Number of Feeds, four to 12, according to style and diameter of machine.

Solid Forged Steel Cylinders, specially hardened or with patent inserted walls for fine fabric.

Special Machinery for Sweaters etc.

We build Loopers, Ribbers and other Machinery for Knitting Mills

As well as

A Complete Line of Full Antomatic and 7-8 Automatic Seamless Hosiery Machinery.

Full Particulars, Samples and Special Catalogues on Application.

2079 E. Cumberland Street, Philadelphia, Pa., U. S. A.

BRANSON MACHINE CO.

BUILDERS OF

KNITTING MACHINERY

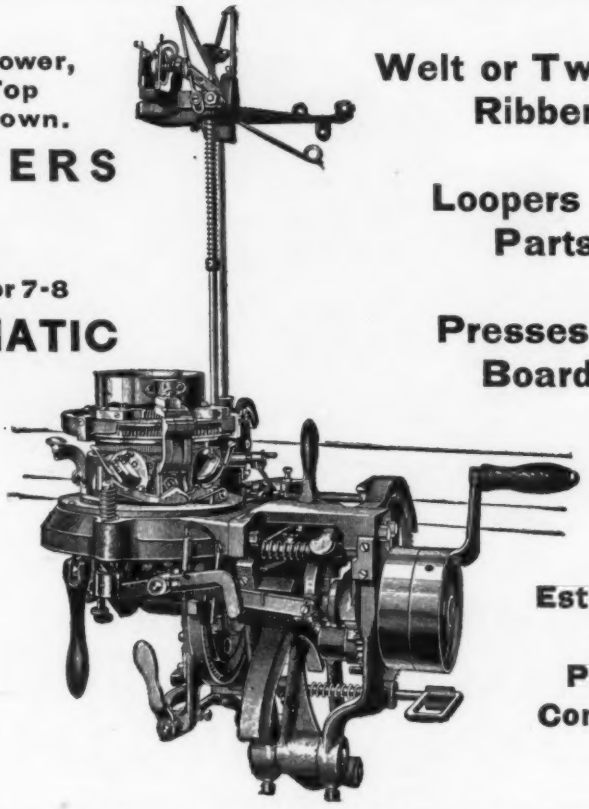
Hand or Power, Open Top or Hold Down.

KNITTERS

1-2, 3-4 or 7-8

AUTOMATIC KNIT-TERS

All Sizes and All Gauges.



Welt or Two-Feed Ribbers.

Loopers and Parts.

Presses and Boards.

Estimates for Plants Complete.

Winders and Bobbins. Hand Forged Steel Cylinders.

BRANSON MACHINE CO.

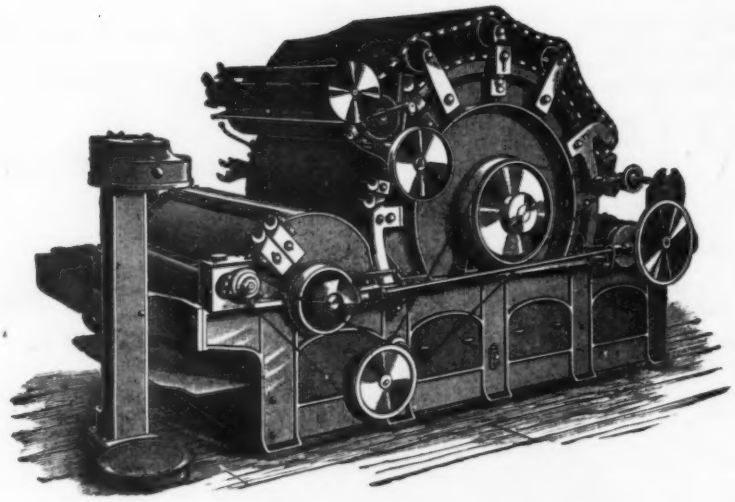
504 North American Street, : : Philadelphia, Pa.

Write for Information and Catalogue.

MASON MACHINE WORKS,

TAUNTON, MASS.

Cotton Machinery



Cards, Combers, Railway Heads, Drawing Frames, Spinning Frames, Mules and Looms,

INCLUDING

Plain and Fancy Silk Looms

Southern Office, Charlotte, S. C.

EVAN ARTHUR LEIGH

232 Summer Street (opposite the South Station), Boston, Mass.

SOLE AGENT IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt Bros. & Co. are exhibiting in the Varied Industries Building, Louisiana Purchase Exhibition, St. Louis, Mo., the most complete line of Cotton Machinery that has yet been exhibited, for spinning from coarse counts up to 300's.

MATHER & PLATT, LTD.

Dyeing and Finishing Machinery. Archbutt-Deeley System for purifying and softening water.

TEXTILE MACHINERY ASSOCIATION, LTD.

Flax, Hemp and Jute Machinery.

THE PATENT AUTOMATIC FEEDING MACH. CO., LTD.

Patent Feeding Machines for wool, cotton, flax, fur and fibrous material.

GEORGE HODGSON, LTD.

Looms for Worsteds, etc.

JOSEPH SYKES BROS., Card Clothing for Cotton.

JAMES CRITCHLEY & SON'S, Card Clothing for Woolen and Worsted.

DRONSFIELD BROS'. Grinding Machinery and Emery Filleting.
The best French and English Combing and Rubbing Aprons.
Harding's Pins and Circles, Varey's Fallers, etc.

THE OLD WAY.

What Changes!

THE MODERN WAY.

Oiling stock with a tin can with holes punched in the bottom, or a watering pot. Wasteful of oil and labor and seldom done twice alike, but is still used in some mills.

Oiling and dampening stock with the Spencer Automatic Oiler applied to feed table of wool picker, lumper or lapper. Batches treated as desired. Perfect regulation.

Not much need to dwell upon the advantages of the automatic system, by which uniform results are obtained with saving of oil and labor, as compared with the sloppy, guess work, waterpot system.

It's the story of the Bramwell and Apperly feeders over again. How many mills are feeding by hand to-day? There will be very few oiling by hand in a few years. Hundreds of the best mills are using the Spencer Oiler to-day. Are you? If not, send for particulars.

GEORGE S. HARWOOD & SON, 53 State St., Boston.

HENDERSON'S

Double Carding Process for Wool

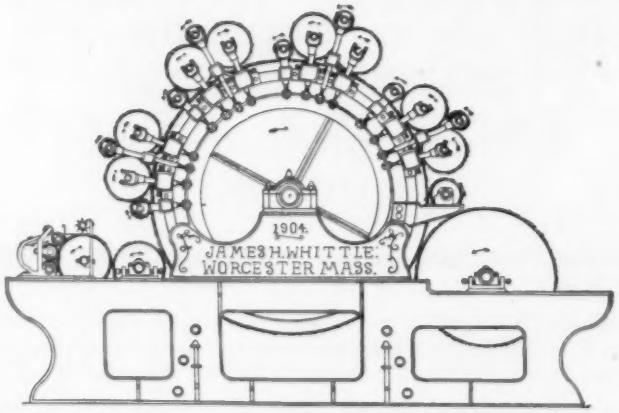
(Patented May 10, 1904)

Is a Great Success.

Manufactured By **JAMES H. WHITTLE,** 150 Harlow St., Worcester, Mass.

INCREASES PRODUCTION AND QUALITY

SAVES LABOR



SAVES ROOM

APPLIED TO EITHER OLD CARDS OR NEW

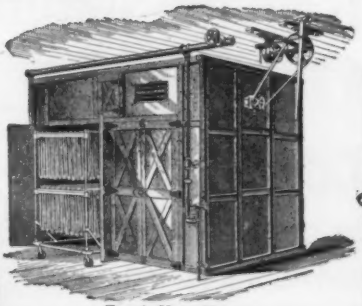
WOOL AND WORSTED MACHINERY

Including Carding Machinery for Wool and Worsted, Yarn Twisters, with or without Novelty Attachments, Yarn Dressers, Reels, Beamers, Single or Double. Yarn Spoolers, Dresser Creels, Cloth Dryers, of all widths, New Rotating Skein Dryers, Four and Eight Drum Spoolers, Improved Hydro Extractors, Improved Dusters with Fan, New Pattern Mixing Picker, Skein Drying Reels, etc.

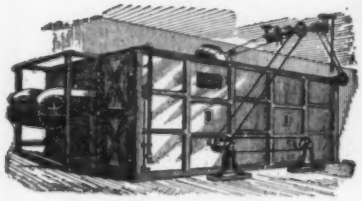
"HURRICANE" DRYERS AND FANS

For WOOL, COTTON STOCK, YARN, STOCKINGS, UNDERWEAR, Etc.

Write for Booklets.



Truck Yarn Dryer.



Cotton Stock and Wool Dryer.

CARBONIZING,

BLEACHING,

"Hurricane" Fan, Style No. 2.

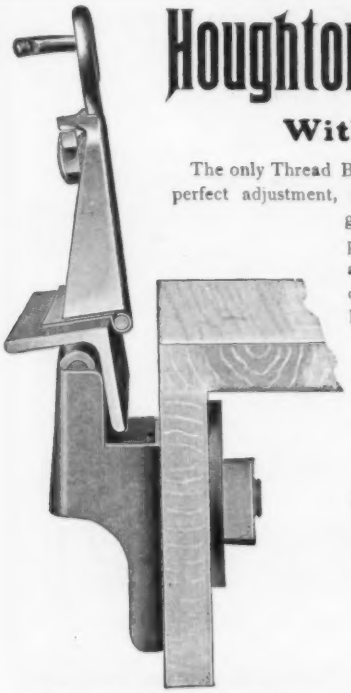
OXIDIZING, CHROMING and WASHING MACHINERY.

PHILADELPHIA DRYING MACHINERY CO.

6721 Germantown Ave., Philadelphia, Pa.

Houghton's All Steel Thread Board

With Hardened Thread Guides.



The only Thread Board that *holds a guide solid* all the time; *never* gets loose; is always in perfect adjustment, and thus must make a saving in travelers, broken ends, waste, thread guide, care and also prolong the wear of rings and increase the production per spindle. These claims are based on the truth of mechanical principles and have been proven true by actual use in many mills, whose superintendents will substantiate these claims. Write for list of mills using our Thread Boards.

PRICE.
Steel Thread Boards, 7½c. per Spindle
Brass Thread Boards, 15c. per Spindle
f. o. b. Worcester.
Add 3c. each for Metal Rail.

1,000,000 Already in Use.

Thousands of wooden thread boards thrown aside and replaced with my Steel Boards because they pay for themselves annually,

PATENTED.

Nov. 30, . .	1897	Nov. 9, . .	1901
Mar. 8, . .	1898	June 9, . .	1903
July 1, . .	1901	Mar. 1, . .	1904
May 10, . .	1904		

and other patents pending.

Any infringements of the above Patents will be prosecuted.

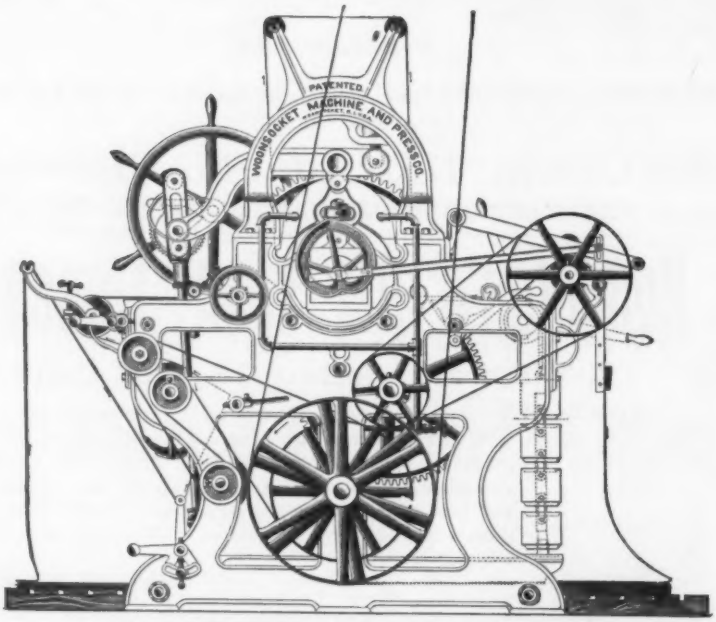
L. T. Houghton, Sole Manufacturer, Worcester, Mass.

Best Patent Steam Rotary Cloth Press

Four Separate Pressings In One Machine!

The Only Press that has Self-Yielding Beds with Four Points of Contact

PERFECT TEMPERATURE, POWERFUL, SIMPLE



THE WOONSOCKET ROTARY PRESS.

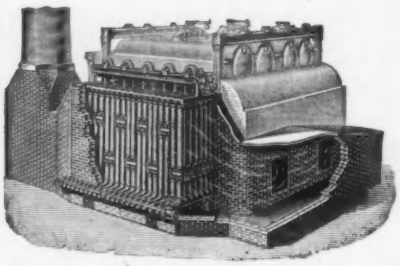
Woonsocket Machine and Press Company

WOONSOCKET, R. I,

In Supplying Boilers with Hot, Purified Water,

Thus keeping a larger heating surface, as well as meeting sudden demands for power, the

Green's Economizer



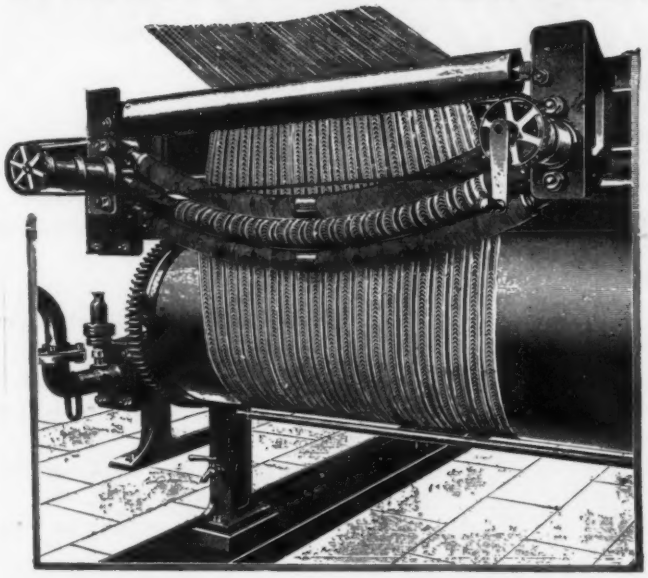
Is but beginning its Savings to Plant Owners.

What has been, and possibly will again be, cost of fuel—one of the greatest expenses of a plant, is reduced from 10 to 20%. Mills, Bleacheries and Dye Works having a *Green's Economizer* realize the greatest saving. We will be pleased to send our free booklet showing construction and how applied.

The Green Fuel Economizer Co.,

Sole Manufacturers in the U. S. A. **MATTEAWAN, N. Y.**

A PERFECT CLOTH EXPANDER



The recent invention of Wm. Mycock, an English cotton manufacturer. Hundreds sold in Great Britian and on the Continent. Large bleacheries in this country where it has been placed on trial are delighted with it. Gets the full width of goods, with perfectly even tension both ways. Can be attached to calenders or cans. Put it on trial.

Patented in United States, Canada, Great Britain and Continental countries. Infringements will be prosecuted.

THOMAS LEYLAND & CO., 53 INDIA ST., BOSTON.

Sole Agents for the United States and Canada.

NOT ONLY
THE LATEST
BUT ALSO THE
SIMPLEST and BEST.

THE CAMLESS WINDER.

For Cones and Tubes.

Send for Descriptive Circular.

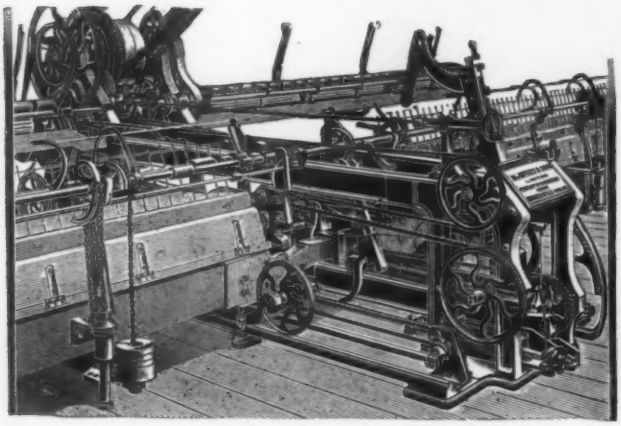
The A. T. ATHERTON MACHINE CO.

PAWTUCKET, R. I.

Telegraphic Address: "WHITELEY, HUDDERSFIELD." Nat. Telephone, 598 and 599.

Wm Whiteley & Sons Ltd.

LOCKWOOD, HUDDERSFIELD.



SELF-ACTING MULE.

Makers of all descriptions of

Tentering and Drying Machines.

Moore & Whiteley's Patent Wool and Cotton Dryer.

Crabbing or Winding-on Frames.

Cross Raising Machines, Wool Scouring Machines.

Hydro Extractors. Warp Sizing.

Cool Air Drying and Beaming Machines.

Warping Mills with Patent Sectional Dividing Apparatus.

Self-Acting Mules. Bobbin or Pirn Winder, &c., &c.

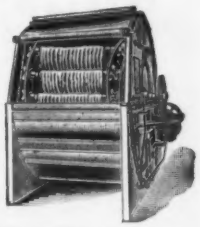
Mercerizing Machinery.

SKEIN AND SLUBBING MACHINES

SAVES

75% in Labor.
30% in Winding.
Steam and Dye Stuffs.
No Friction.
No Tangling.

CAPACITY
50 to 700 lbs per batch.



THE KLAUDER-WELDON DYEING MACHINE CO.

AMSTERDAM, N. Y.

Builders of Machines

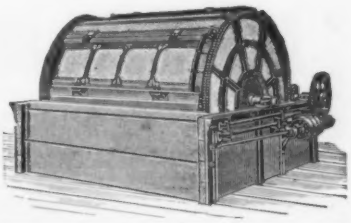
For Skein—Worsted, Slubbing, Cotton and Silk.
" " and Warp Mercerizing.
" Raw Stock—Cotton, Wool, Waste and Rags.
" Garments—Underwear, Hosiery and Caps
" Sulphur Colors—Raw Stock, Skein and Hosiery.

RAW WOOL AND COTTON MACHINES.

CAPACITY
200 to 1000 lbs per batch.

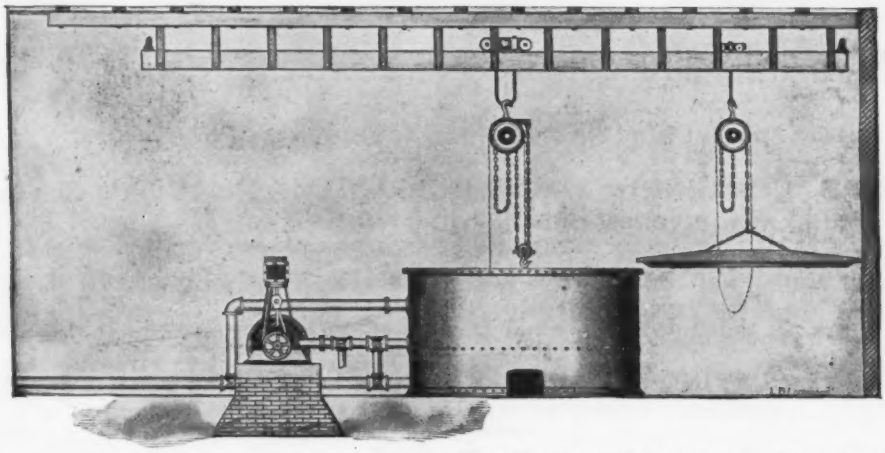
SAVES

50% in Labor besides Steam and Dye Stuffs. Practically indestructible. Leaves stock in perfect condition.



VACUUM DYEING MACHINE CO., CHATTANOOGA, TENN.

RAW STOCK, YARN AND HOSIERY DYEING MACHINES



OFFICE OF TREMONT & SUFFOLK MILLS, LOWELL, MASS., Jan. 14, 1904.

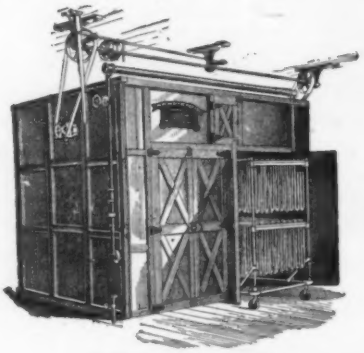
VACUUM DYEING MACHINE CO., Chattanooga, Tenn.

GENTLEMEN: Replying to your inquiry in regard to what we think of your Raw Stock Dyeing Machine, would state that we have been using one about six months, with very satisfactory results, the dyeing being level, and the stock left in first-class condition for spinning. Can give your machine no better recommendation than to say, we think so well of it that we have just placed an order for two additional machines.

Yours truly J. J. CONNELL, Agent.

"20th CENTURY" MACHINERY

DRYERS
for
WOOL,
COTTON STOCK,
YARN, STOCKINGS,
UNDERWEAR.
VENTILATING FANS.
MACHINERY
for
CARBONIZING
and
YARN SCOURING.



TRUCK YARN DRYER.

CLOTH WASHERS
and
CLOTH DYEING MACHINES, BLEACHING MACHINERY FOR KNIT GOODS, ETC.
CONTINUOUS SYSTEM
FOR BLEACHING COTTON STOCK.
TOM-TOMS,
CHROMING, WASHING
and
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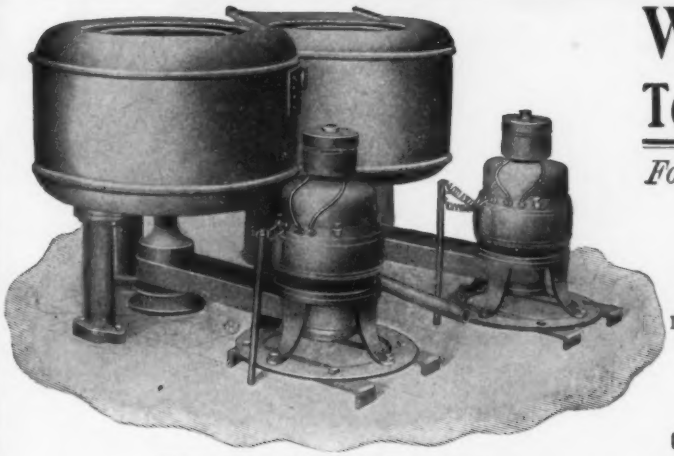

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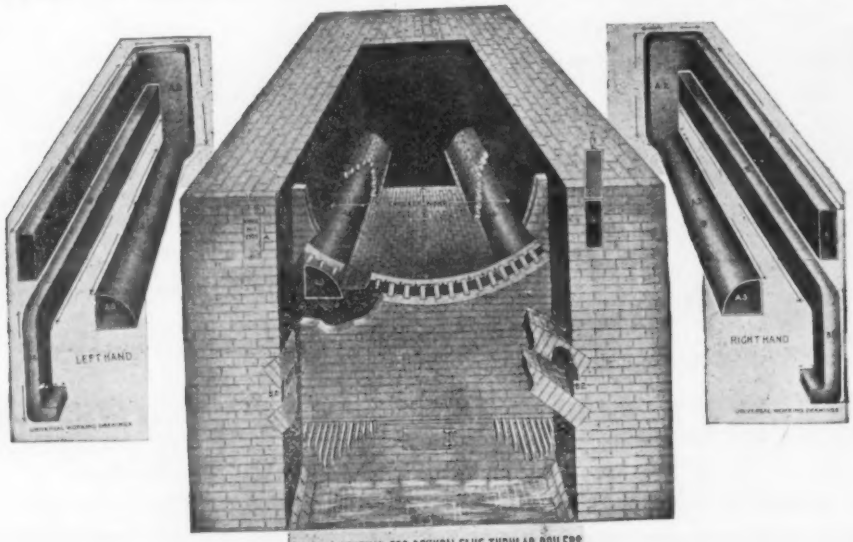
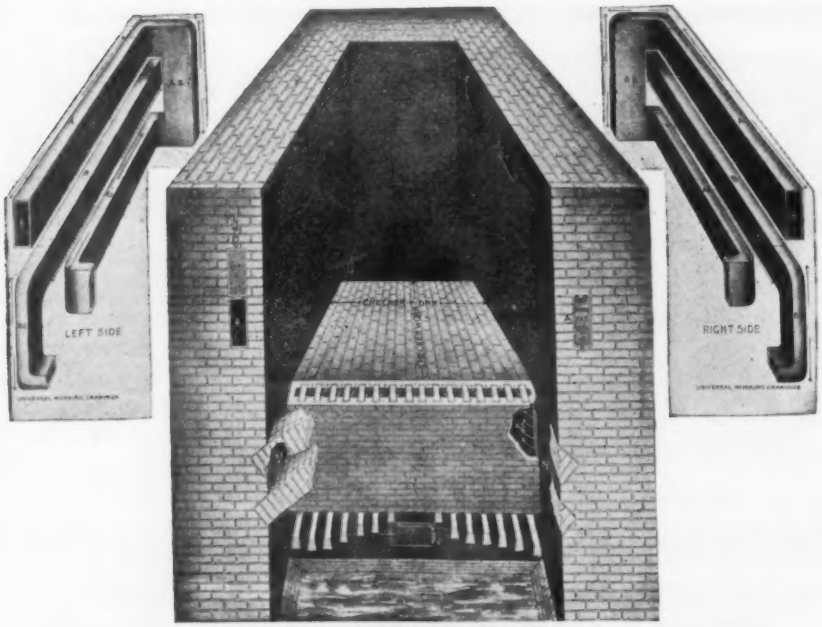


TYPICAL SETTING FOR RETURN FLUE TUBULAR BOILERS



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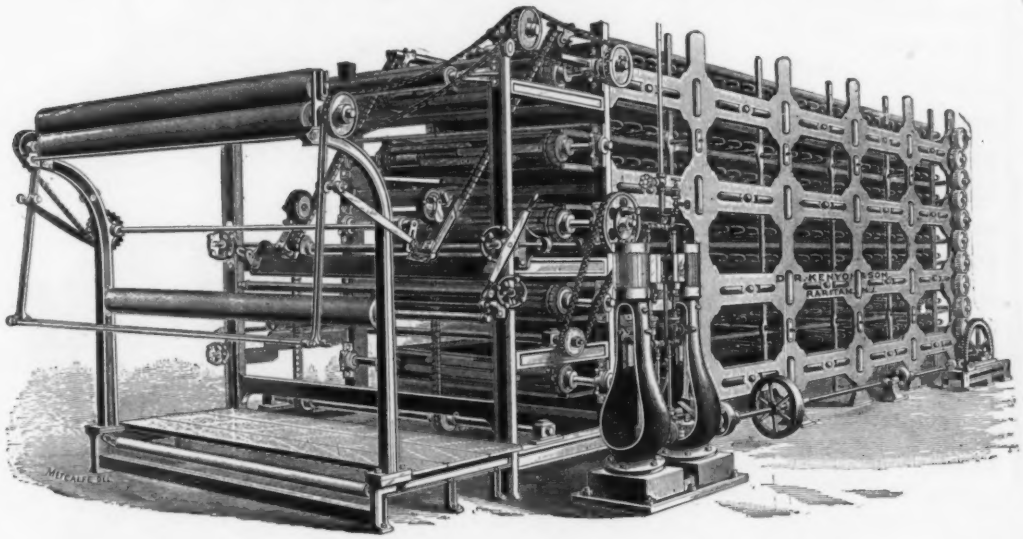
Tentering and Drying Machines on Pipe System. Special Dryers for Heavy Felt Goods. Hot Air Drying and Tentering Machines.



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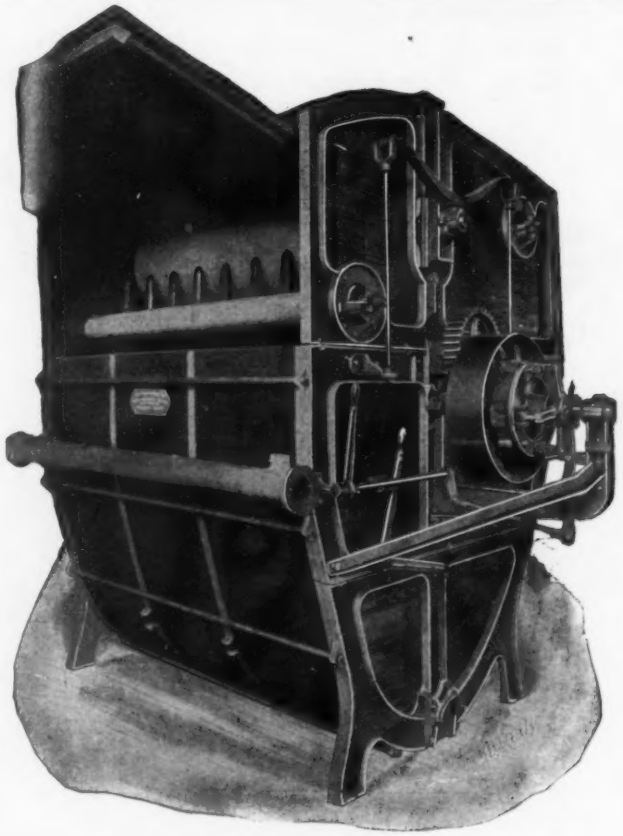

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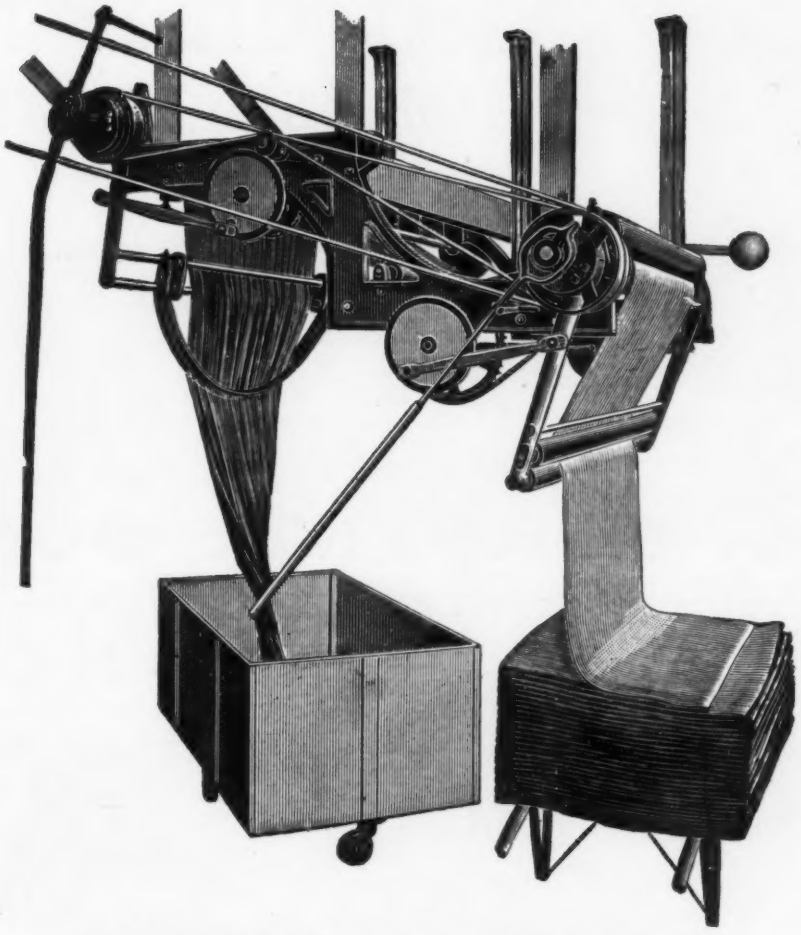

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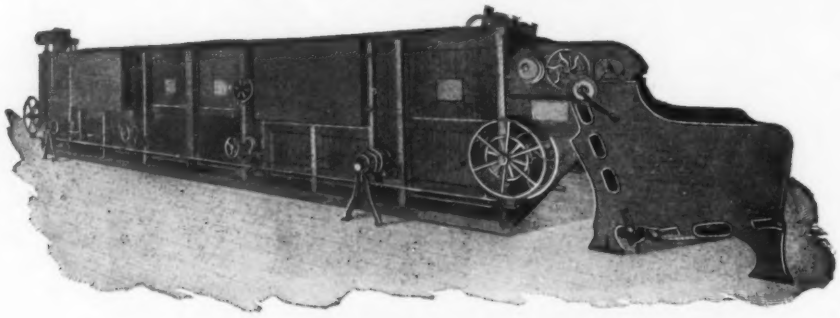

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Which are adapted for making all kinds of

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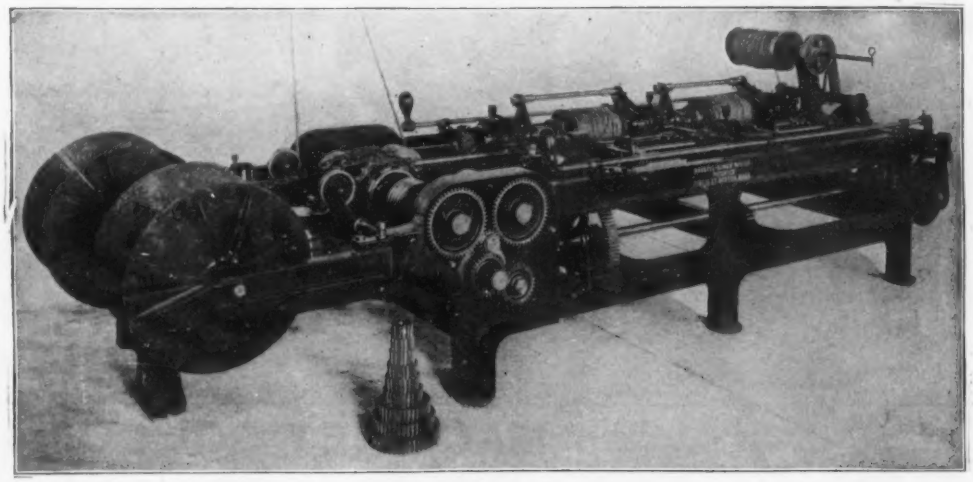

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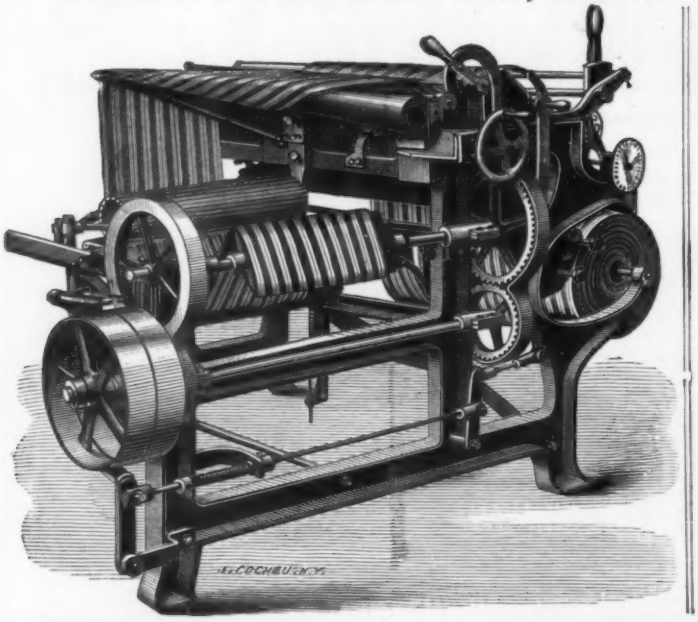

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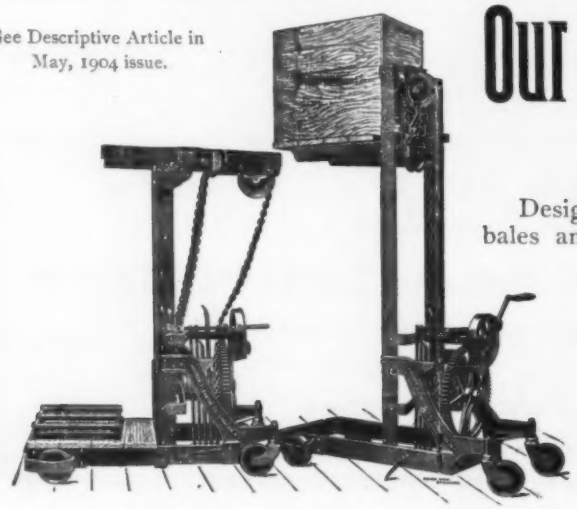

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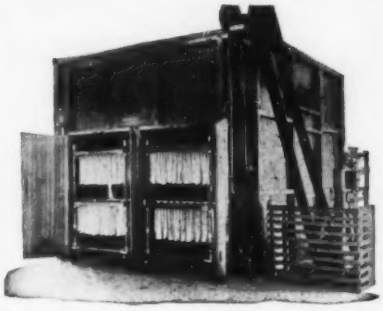

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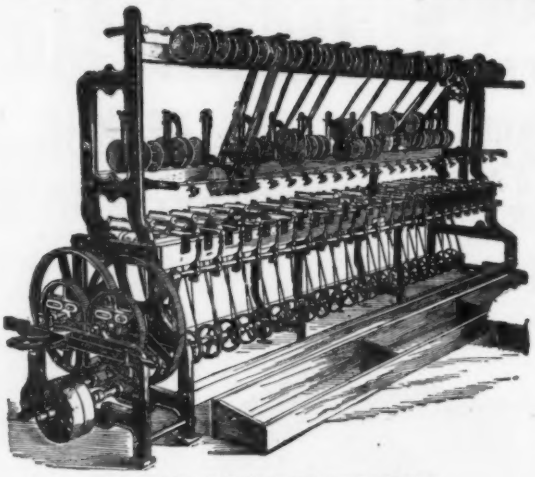
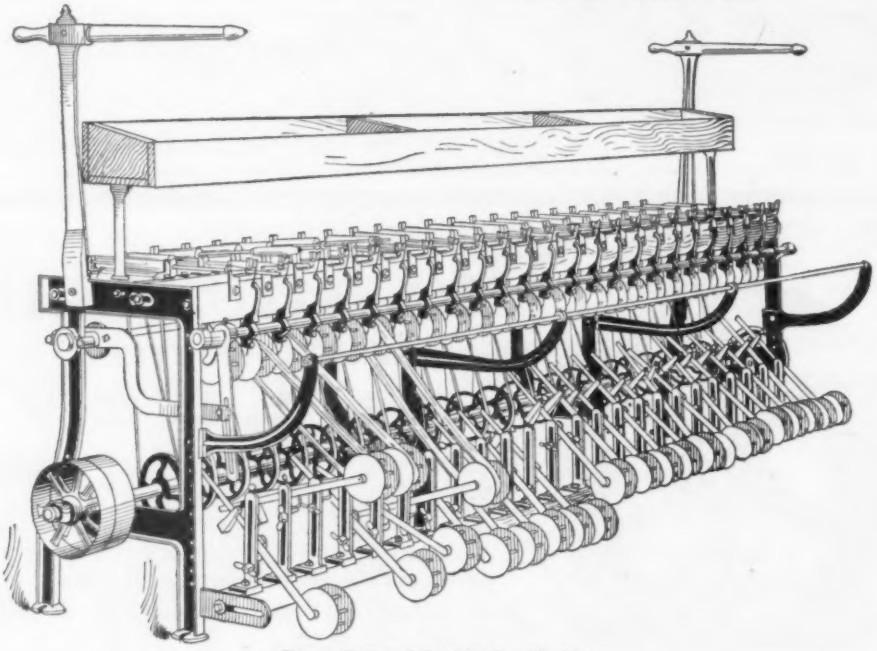


Patent Shuttle Bobbin Winder for Skeins, with Patent Variable Motion.



Patent Butt and Cop Winding Machine.

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FULL PARTICULARS ON APPLICATION.

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DURABLE
MACHINE

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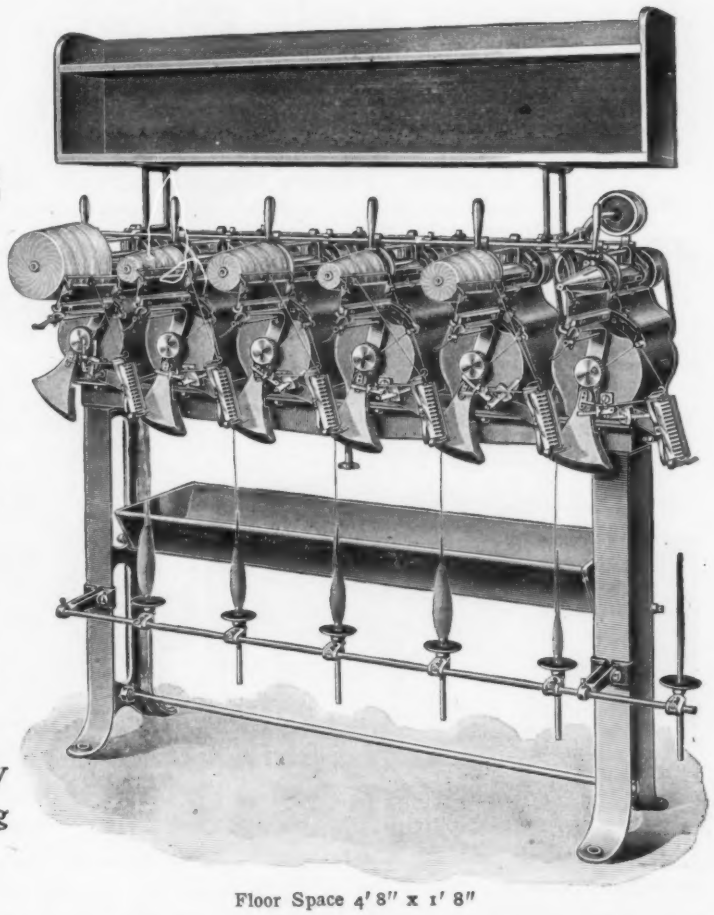
High Speed,
Automatic.

Does Not
Disturb the Twist.

The Cop is positively driven with no driving drum to roll the yarn.



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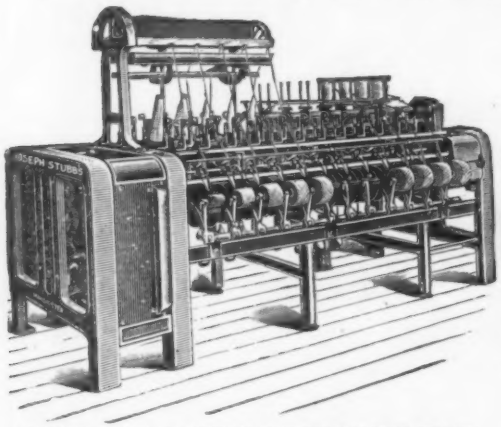
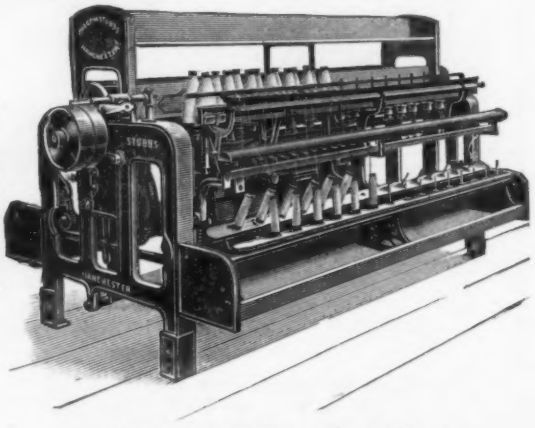


PATENT QUICK TRAVERSE COTTON GASSING FRAME.



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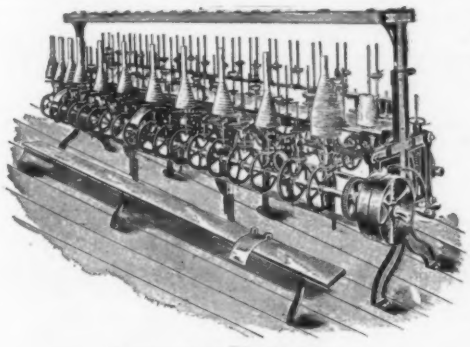

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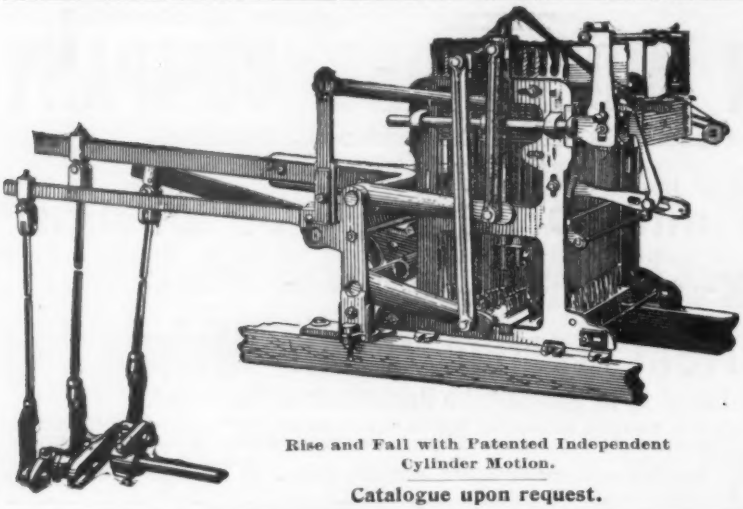

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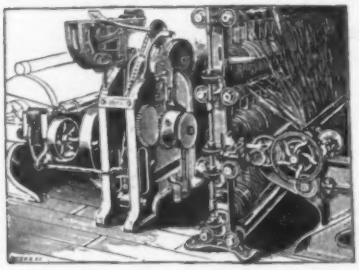

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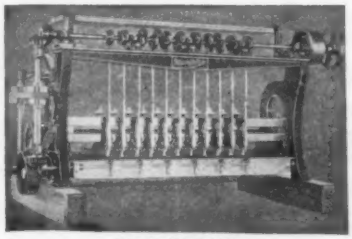

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FOR ALL PURPOSES WHERE A NUMBER OF ROWS OF SEAMS ARE REQUIRED

BUILT WITH ANY REQUIRED NUMBER OF NEEDLES.

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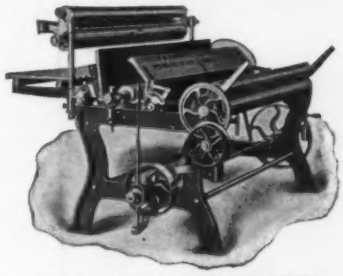
WOOL BURRING and PICKING MACHINERY

CLOTH FINISHING MACHINERY



DEWING OR SPRAYING MACHINE

Curtis & Marble Mch. Co.

WORCESTER, MASS.

R. H. HOOD,

Successor to THOMAS RAMSDEN,

Maker of

Worsted Machinery,

For Preparing, Finishing Gills and Drawing Boxes

New Screws made and old ones repaired and thoroughly case-hardened

Repairs and new parts for curled hair machinery. Fallers of every description made. Change Gears, 5-8, 7-16, 3-8 and 1-4 inch pitch kept on hand. All kinds of new Fluted Rollers, for Combs, Gills, Drawing and Spinning; also Refluting old ones. Improved Roller Covering Machine.

1842-44-46 GERMANTOWN AVENUE, PHILA., PA.

FRANK B. KENNEY, Manager

T. C. ENTWISTLE COMPANY

Builders of

WARPING, BALLING AND BEAMING MACHINERY

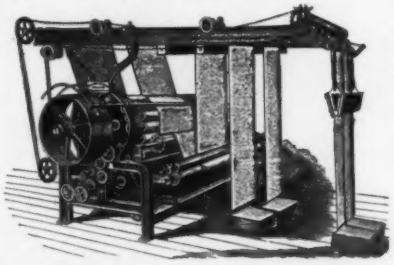
EXPANSION COMBS AND CARD GRINDERS

LOWELL, MASS.

ECLIPSE NAPPING MACHINE.

Fabric in Direct Contact with the Napping Rollers all around the Drum.

Greater Production. Better Finish. Easier Threaded. No Shifting of Filling. Better results than can be obtained with teasels.



Long or short nap as desired on cotton or woolen goods, from the lightest to the heaviest.

No heavier napping on the sides than in the centre.

RICHARD C. BORCHERS & CO.,

Cor. Womrath and Tackawanna Sts.,

Sole Manufacturers in the United States. FRANKFORD, PHILA., PA.

WILLIAM SCHOFIELD CO.

Krams Ave., formerly Church St., Manayunk, Phila., Pa.

IRON FOUNDERS

AND TEXTILE MACHINERY BUILDERS

Makers of Rag, Wool, Hair and Finishing Pickers, **Automatic** Square and Cone Willows, "Schofield" Intermediate Feed for Cards, Rag and Extract Dusters, Waste Pullers, Worsted and Shoddy Reels, All Kinds of Spike and Slat Aprons.

Special Machinery Built General Machinery Repairs

Relagging Picker Cylinders a Specialty

Hetheringtons

Are THE SOLE MAKERS of

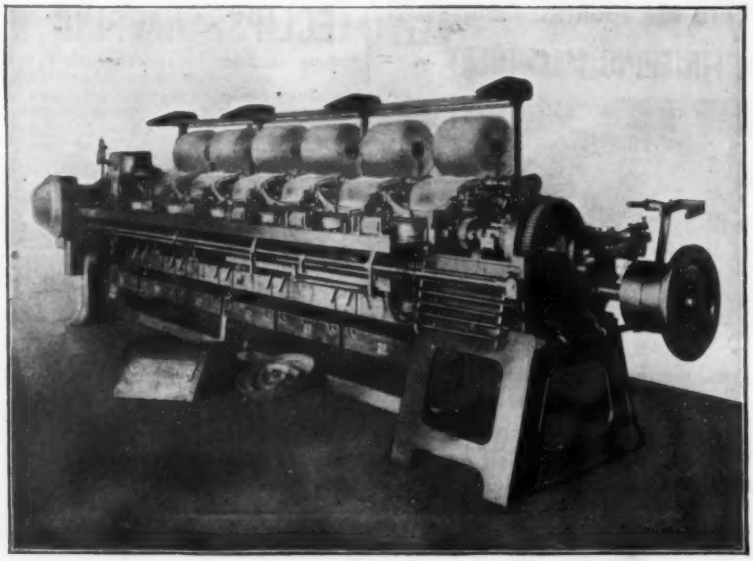
THE NASMITH COMBER

FOR

Fine and Coarse Combing.

Deals with Staples from 7-8 in. to 2 in.

350 Combers now in Operation, 75 more on order.



MAKES A PERFECT PIECING ON SHORT STOCK.

Produces from 100 to 180 lbs. in ten hours according to quality required. Only one cam in the whole machine; all other motions are continuous.

Descriptive pamphlets and and all particulars, including arrangements for seeing machine in operation, from

STEPHEN C. LOWE, 186 Devonshire St., Boston.

Sole Agent for United States and Canada for
JOHN HETHERINGTON & SONS, Ltd., Manchester, England.

THE COLDWELL-GILDARD

Warp Stop-Motion

FOR LOOMS

(Broadly Covered by Patents Issued and Pending.)

Many thousands placed in successful operation during the past four years on coarse, medium and fine cottons, velvets, plushes, ginghams and alpacas in leading mills

EFFICIENCY

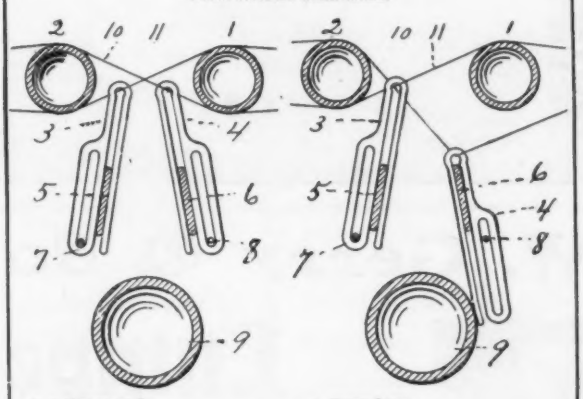
SIMPLICITY

DURABILITY

ECONOMY

THE "C. & G." IMPROVED STOP-MOTION AND METHOD OF APPLYING TO WARP.

WITH PATENT DROP-BARS.



1, 2, Lease-rods.
5, 6, Upper circuit guide-rods.
9, Lower circuit bar.

3, 4, Drop-bars
7, 8, Retaining rods.
10, 11, Warp threads.

The above cut shows the stop-motion with drop-bars in normal position before break in warp thread, the electric circuit from the upper circuit guide-rods to the lower circuit bar "9" not being completed.

The above cut shows stop-motion after a break in warp thread "10," the drop-bar "4" having fallen and completed the electric circuit from the upper circuit guide-rod "6" to the lower circuit bar "9," thereby stopping the loom.

Widest in Range of Use

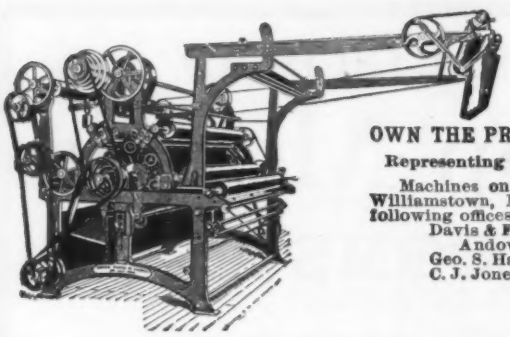
Lowest in Cost of Maintenance

DECREASED WEAVING COST
IMPROVED QUALITY OF PRODUCT
A "UNIVERSAL" STOP-MOTION

Samples and copy of our Illustrated Catalog sent on application

The Coldwell-Gildard Co.

108-110 Hartwell St., .. FALL RIVER, MASS.



The American Napping Machine Co.

OWN THE PRINCIPAL PATENTS ON NAPPING MACHINES.

Representing the latest French, English and American Patents.

Machines on Exhibition and Samples Napped at North Andover and Williamstown, Mass., or Philadelphia, Pa., on application to any of the following offices:

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Geo. S. Harwood & Son, 53 State Street, Boston.
C. J. Jones, Salesman, No. 100 West Lehigh Ave., Philadelphia, Pa.

H. H. HEAP, Treasurer and General Manager,
WILLIAMSTOWN, MASS.

Established 1870

John Heathcote & Son

Providence, R. I.

Builders of Improved

Cloth Tentering and Drying Machinery

for WOOLENS, WORSTEDS, FELTS, etc.

Built Upright or Horizontal with Low Down Feed

Ventilating Fans a Specialty

Send for Catalogue

Geo. W. Gerry & Son, ATHOL, MASS.

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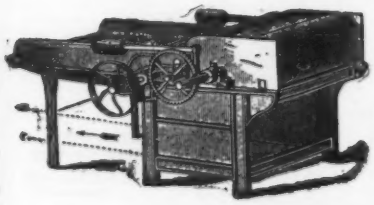


Lumpers,

Wool and Waste Dusters,
Rag Dusters, Nappers.

Improved Cloth Measuring Machines.

Lumper and Duster Cylinders Refilled and Repaired.

Established 1849. Mass. Corp. S. R. MASON, Treas. and Mgr.

MASON BRUSH WORKS,

Manufacturers and Repairers of

CARD ROLL.

Mill and Machine Brushes

For Textile, Paper Mills, Etc.

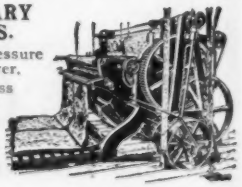
Write for Catalogue. WORCESTER, MASS.

New and Second-Hand Cloth Presses

LATEST MILLER ROTARY STEAM CLOTH PRESS.

Patent Flexible Steel Bed. Pressure automatically appplied by power.

1 6/4 double bed second-hand press
1 8/4 " " " "
1 6/4 single " " "
at a bargain.



Miller Press & Machine Co.
WOONSOCKET, R. I.

DINSMORE

Mill Sewing Machines

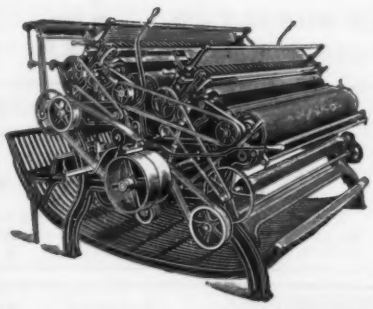
No. 9—Portable Foot-Power Rotary Sewing Machine.

It is especially adapted for use in Cotton and Woollen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

DINSMORE MANUFACTURING CO.,
Salem, Mass., U. S. A.

DOUBLE SHEAR



The Finest Shearing Machine in the World. Get into line. Use Double Shears. We will take your Single Shears in trade. Our representative can interest you. He will call at a word from you.

Parks & Woolson Machine Co. Springfield, Vermont.

NORTH CHELMSFORD MACH. CO.

SUCCESSORS TO SILVER & GAY CO.

Manufacturers of

Automatic BALL WINDERS, adapted to all kinds of Twines, Silks and Floss. QUILLERS and REELS. Also SPECIAL MACHINERY from DRAWINGS or PATTERNS.

Repairing, Turning and Refluting Worsted.

Spinning and Drawing Rolls a Specialty.

NORTH CHELMSFORD, MASS.

LOWELL CRAYON CO.

We are still making

THE BEST MILL CRAYON

in Fifteen Colors for COTTON, WOOLEN and WORSTED MANUFACTURERS.

Original Makers Samples Sent

LOWELL, MASS.

Established 1844.

BENJ. BUCKLEY'S SON,

(WM. J. BUCKLEY) **Gun Mill, Patterson, N. J.**

Manufacturer of all kinds of SPINDLES, FLYERS, RINGS, TUBES, CAPS, etc., for Cotton, Silk, Flax, Woolen and Worsted **Machinery.**

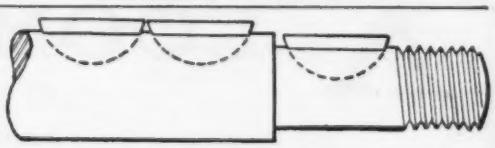
Roving Spindles and Flyers a Specialty. Light Forgings.

REPAIRING OF ALL KINDS.

Key Seating Attachment

FOR

Whiton Gear Cutter



We offer an attachment for use with our Gear Cutting Machine, to cut key seats for the Woodruff System of Keying. Write for description, circulars and price.

THE D. E. WHITON MACHINE CO.,
19 Oak Street, New London, Conn.

ANYTHING

Entire Outfits for New Mills, or small and odd items that that you don't know just where to obtain, can be found at the

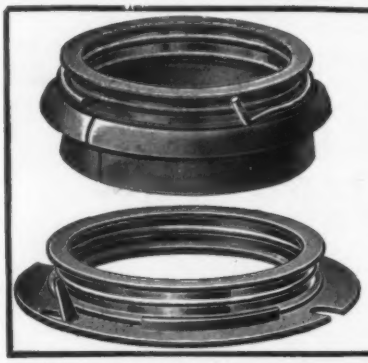
AMERICAN SUPPLY CO.,
PROVIDENCE, R. I.

in Mill Supplies.

E. L. TEBBETS & CO.,
Locke's Mills, Me.

Thread and Silk **SPOOLS** of any description.

We are located in the best white birch region. Our work and prices seem to satisfy the most particular customers. We can give any finish desired. Estimates furnished on samples submitted.



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SPINNING RINGS.
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RING HOLDERS.
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Paper Dealers,

23-25 So. 4th St., Phila.

Fibre, Manilla, and Colored Wrapping Paper

Leather Fibre S Manilla — ALL RAG and ALL LINEN } PRESS BOARDS — Tissue

Write for full set of Samples.

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PERFECT RIGID CLOTH S BOARD TRADE MARK

Paper Cloth Boards For Textile Mills

All weights and sizes furnished by thousand, ton or carload. Prompt delivery assured. Samples and prices on request.

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OF MERIT

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We are making a specialty of **NORTHROP** Pickers in a single grade only. We throw out all soft and thin leather and use in these pickers only leather which is hard and solid. We press these pickers so completely that they are like one solid piece of leather and this same pressure makes the end of the lap and the rivets and burrs flush with the side of the picker. Results show that this a picker of unusual merit and we confidently believe, price and quality considered, it is the best value yet offered.

GARLAND MFG. CO., Saco, Maine. Formerly Loom Picker Co.

E. DIXON. Established 1876. F. M. DIXON.

DIXON LUBRICATING SADDLE CO., Bristol, R. I.

SOLE MANUFACTURERS OF

Dixon's Patent Locking Saddles and Stirrups.

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long staple cotton is used.

THE STIRRUP IS ALWAYS IN PLACE.
NO BENT STIRRUP RESTING ON ROLLS.

Manufacturers of all kinds of Saddles, Stirrups and Levers. Send for Samples and Prices.

Spinners' Supplies in general.

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Card Clothing of Every Description

HENRY ASHWORTH, Agt. FALL RIVER, MASS.

OVERHEAD CARRYING TRACK.

The above shows our round edge, flat, steel track with ball-bearing trolleys, both single and double, adapted to any kind of business and most durable track structure in use, ness and carry any load—it makes the least expenspan between beams is six feet or over the market. When sive and most durable track structure in mediate hangers. Our ball-bearing we use channel iron trolleys have hard reinforcement with short interened steel centres and are so made as to turn easily around a circle of 12-inch radius. Illustrated catalogue and prices on application.

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Sole Manufacturer in the United States of **Brass and Steel** **MAILS**

Liberal Discount to Dealers.

RICHARDSON BROTHERS,

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Manufacturers and Dealers

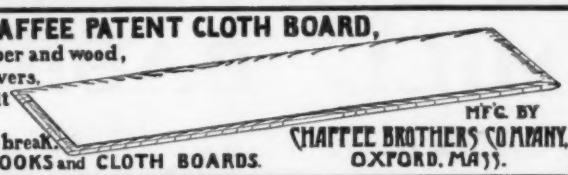
Fine Colored Textile Wrappers, Silk Papers & Specialties,

for Finishers of

COTTON, SILK AND WOOL GOODS. "ROYAL" ENGLISH PRESS PAPERS.

Patent ROUND EDGE CLOTH BOARDS.

SAVE	THE CHAFFEE PATENT CLOTH BOARD,	Clean
Their Cost	Made of paper and wood, Needs no covers, Will not split or warp; Not liable to break.	LIGHT
In Freight.	BOX SHOOKS and CLOTH BOARDS. MFG. BY CHAFFEE BROTHERS COMPANY, OXFORD, MASS.	Strong



Shaw's "Victor" Travelers

Manufactured by

VICTOR SHAW RING TRAVELER CO.

Incorporated 1899.

23 Sabin Street, PROVIDENCE, R. I.

ELEVATORS.

OUR FACILITIES INCLUDE

A modern factory, competent engineering talent, a local agent and a force of skilled mechanics in Boston, New York, Philadelphia, Baltimore and Atlanta.

We offer you the best Passenger and Freight Elevators (Hydraulic, Electric, Belt or Hand Power). We guarantee right prices for the apparatus furnished. Prompt attention to inquiries and prompt shipments.

Morse, Williams & Co.,

Philadelphia

Boston **New York** **Baltimore** **Atlanta**

A Mill Basket

Should Last Indefinitely

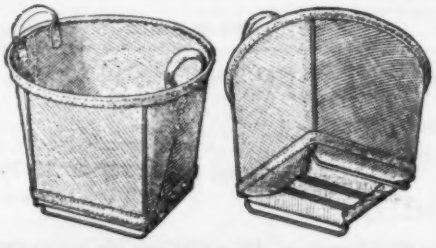
The MORRIS Duck Mill Basket does last a long time.

It's bound to.

It's construction is such that it literally has to wear out.

It won't break. We sometimes think it lasts too long—such a long time between orders.

Made round, square or oblong. Send for booklet. Address,

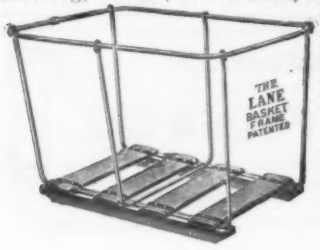


Morris & Co., Dept. T, Groveville, N. J.

THE LANE PATENT STEEL FRAME CANVAS

MILL BASKET

Embodies desirable features not found in any other basket. It is made of strong, smooth, cotton duck, doubled at all points of extra wear or strain. The Frame is made of specially drawn round spring steel, put together with our semi-flexible eye joints, making it strong and sufficiently rigid, yet springy and resilient, and will stand the most severe use.



W. T. LANE & BRO.,

MANUFACTURERS

Formerly of Port Chester, N. Y.

FIG. 20.

POUGHKEEPSIE, N. Y.

KILBURN, LINCOLN & CO.,

FALL RIVER, MASS.

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LOOMS

For PLAIN and FANCY WEAVING.

Represented in the South by
O. A. ROBBINS, . . . CHARLOTTE, N. C.

Vulcan Fibre Roving Can.

BODY—Vulcanized Fibre. SIDE SEAM—Riveted with Patented Clinched Rivets. RINGS—Tinned Steel, Brazed Joints, Curled Edges. BOTTOM—IXXX. Tin Star Corrugation; Fastened without the use of nails or screws, will not crack, warp or shrink and cannot come out. FINISH—Coated inside and out with moisture proof coating, handsome and smooth. WEIGHT—About one-half pound per inch diameter. SIZE—All cans to any exact size, perfectly round and true. DURABILITY—Superior to any other can.

Also Manufacturers of

HILL'S IXXX TIN AND GALVANIZED IRON DYE HOUSE CAN.

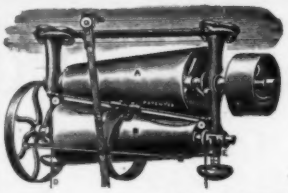
James Hill Manufacturing Co.,

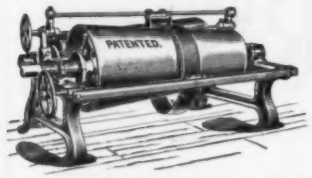
PROVIDENCE, R. I.

EVANS' FRICTION CONES.

Eight Thousand Sets in Operation in This Country and Europe.

A partial list of manufacturers who have Evans' Friction Cone Pulleys in operation, transmitting from ONE TO FORTY HORSEPOWER: National Biscuit Co., Richmond, Ind., 300 sets. Merrimack Mfg. Co., Lowell, Mass. 20 sets. Arnold Print Works, No. Adams, Mass., 11 sets. John & James Dobson, Philadelphia, Pa., 34 sets. Stinson Bros., Philadelphia, Pa., 40 sets. Frederic J. Falding, New York, N.Y., 20 sets.





Smith & Winchester Co., So. Windham, Conn., 250 sets. Furguson & McRae, Belfast, Ireland, 25 sets. Mercantile Laundry, So. Windham, Conn., 250 sets. Washburn & Moen, Worcester, Mass., large number, all sizes. Dennison Tag Co., Boston, Mass., large number, small sizes. Saco & Pettee Machine Co., Newton, Mass., 275 sets. Pacific Mills, Lawrence, Mass., 13 sets.

Send to G. FRANK EVANS, 1288 Center Street, Newton Center, Mass., for Illustrated Catalogue.

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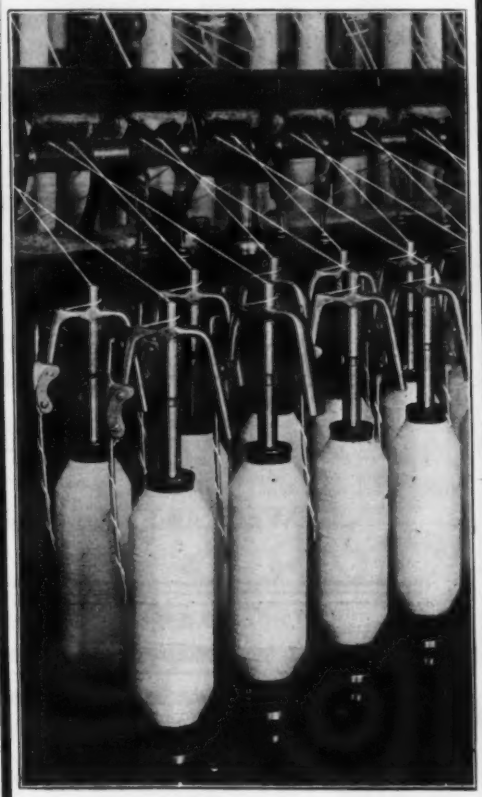
Presents new principles and methods in Flyer construction that have proved their value and made its use of marked advantage.



3½ Inch Diameter Bobbins

are built with 7x3 Dunn Flyers on 4½" space frame with the further advantage of being able to run as fine as 15 hank roving on same flyers. Further information may be promptly obtained by addressing the

TEXTILE MACHINERY COMPANY

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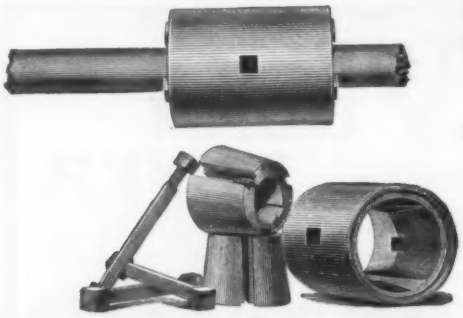


THE "SELLERS" MAKE OF

A DOUBLE CONE VISE COUPLING

has a way of holding shafts together, that no other COUPLING can equal.

WILLIAM SELLERS & CO., INCORPD.

PHILADELPHIA, PA.

Makers of

SHAFTS,
COUPLINGS,
PULLEYS,
HANGERS,

and all most approved appliances for the

Transmission of Power.

SEND FOR CATALOGUE AND PRICE LIST.

MACHINE TOOLS.
INJECTORS. POWER CRANES.

Singeing Machines

FOR ALL KINDS AND WIDTHS OF GOODS.

CHAS. H. KNAPP,

Wait and Rye Streets, PATERSON, N. J.

CORRESPONDENCE SOLICITED.

SALEM ELEVATOR WORKS

SALEM, MASS.

ELEVATORS

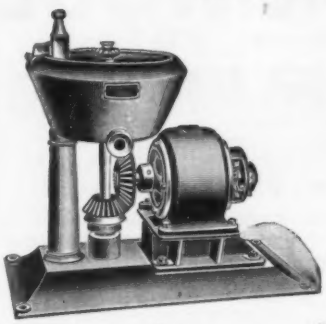
ESPECIALLY ADAPTED FOR MILL USE.

SEND FOR ILLUSTRATED CATALOGUE AND ESTIMATE.

ELECTRICALLY DRIVEN

CENTRIFUGAL

Oil Separator



MOTOR WOUND FOR ANY VOLTAGE.

Separates oil from bolts, nuts, and scraps of all kind—oil that would otherwise be wasted, and makes it as good as it ever was, for further use. **Send for Catalogue.**

MANUFACTURED BY THE

American Tool & Machine Co.,

109 Beach Street, Boston, Mass.

Incorporated 1864. Founded 1845.

Send for Samples and Price List.

INCREASED EFFICIENCY CLEANLINESS SATISFACTION

LESS OIL REPAIRS WORN OUT BEARINGS

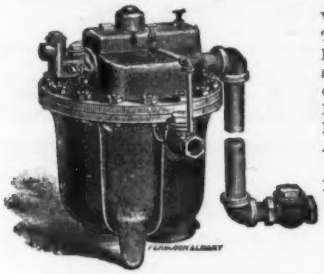
When Machines Are Fitted With

TUCKER OIL CUPS

W. & C. F. TUCKER, HARTFORD, CONN.

STEAM TRAPS

NEW FEATURES: Wearing Parts, Valve and Seat Renewable.



We manufacture Steam Traps for all duties, High and Low Pressures, returning the Condensation back into Boiler or discharging to Hot Well, Tank or Atmosphere.

No Elastic Gaskets, all Joints Ground Metal and Metal.

Class A Return Trap

SEND FOR Catalogues A, B, and C.

ALBANY STEAM TRAP CO.,
ALBANY, N. Y.
Established 1870.
FRED'K TOWNSEND, Pres. JAMES H. BLESSING, Gen. Mgr.

WICKES

Vertical Water Tube

BOILERS

Built by
WICKES BROTHERS,
SAGINAW, MICHIGAN.

Branch Offices at
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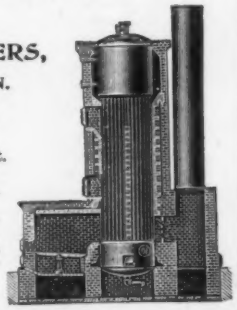

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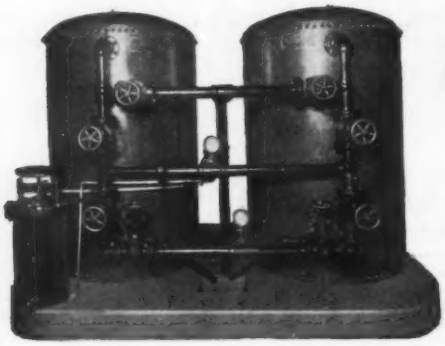

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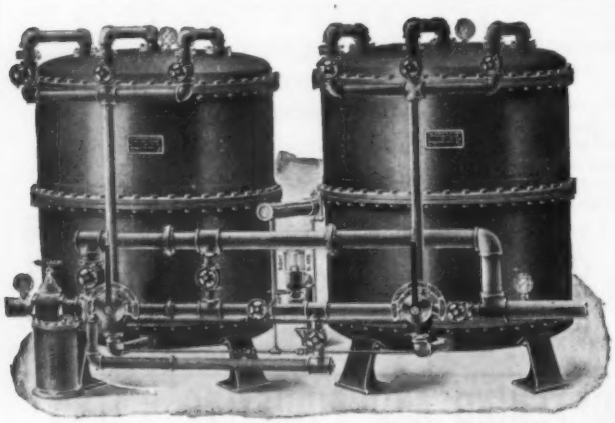

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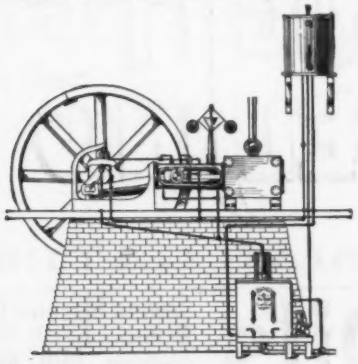

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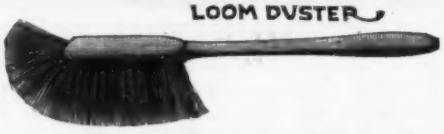

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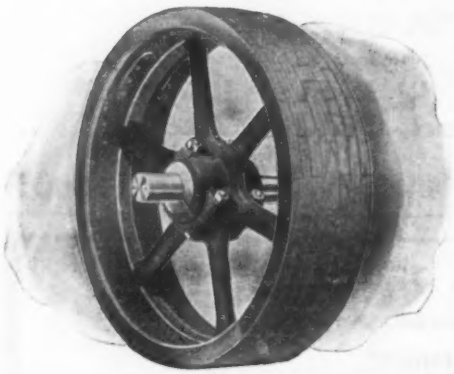

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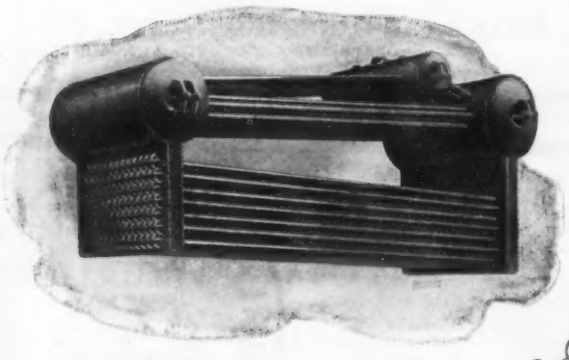

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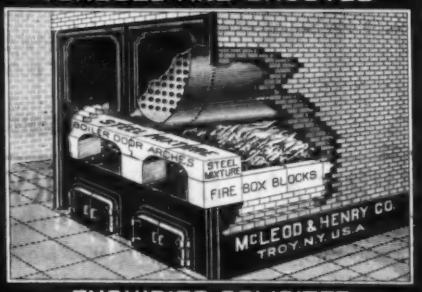

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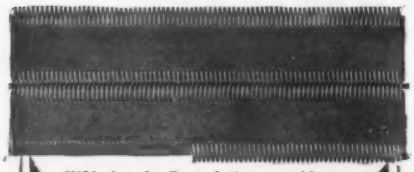

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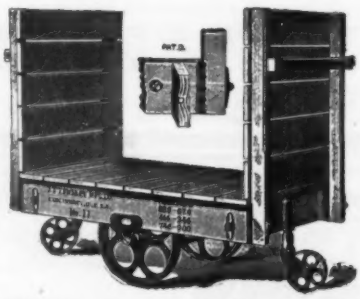

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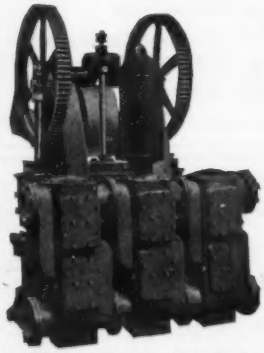

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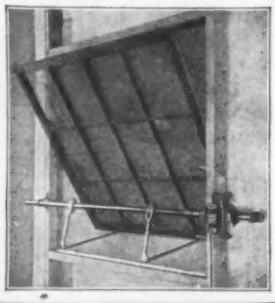

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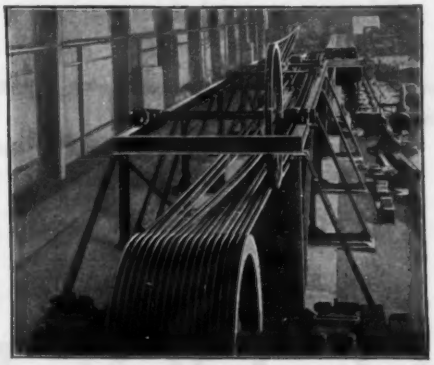

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PART I. Contains a complete directory of all the textile establishments in the United States and Canada. It tells what goods are made, the number of sets of cards, spindles, looms, whether and what they dye or finish, steam or water power, who the selling agents are, the names of the officers, superintendent and buyer.

There are 22 textile maps; gives population of town and railroad connections.

PART II. Is the Yarn Trade Index, containing classified lists of yarn spinners, arranged according to kind of yarn, size and number spun, etc. All the mills with worsted machinery are included in this section.

PART III. Contains Classified List of mills doing order and commission work, also dyeing, finishing, bleaching and printing establishments, classified according to the kind of work done, and so far as possible giving width of goods handled; also shoddy, extract and flock manufacturers and wool scouring establishments.

PART IV. Manufacturer's Selling Agents and Dry Goods Commission Merchants, giving the name and address of concern, character of goods handled, different departments, with managers, list of manufacturing clothiers, and suit and cloak manufacturers, giving specialties and buyers names. A list of city offices of textile mills is given.

PART V. Dealers and Brokers in raw materials and stock, including wool and shoddy dealers and brokers, cotton dealers and brokers, factors and buyers and wholesale rag dealers making a speciality of textile interests.

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is published early each year by Lord & Nagle Company. It is a complete directory of all the establishments in the United States and Canada manufacturing knit goods. It gives the location of the mill, the capital stock, names of the officers, superintendent and buyer, class of goods made, the machinery, including number of knitting machines and sewing machines, selling agents, if any, and in most cases the class of yarn bought. It also contains a list of commission houses making a specialty of knit goods, and jobbers and large retailers having knit goods department, in most cases giving the names of manager in charge of knit goods. The book is small so that it may be carried in the pocket. Price is $1.00.

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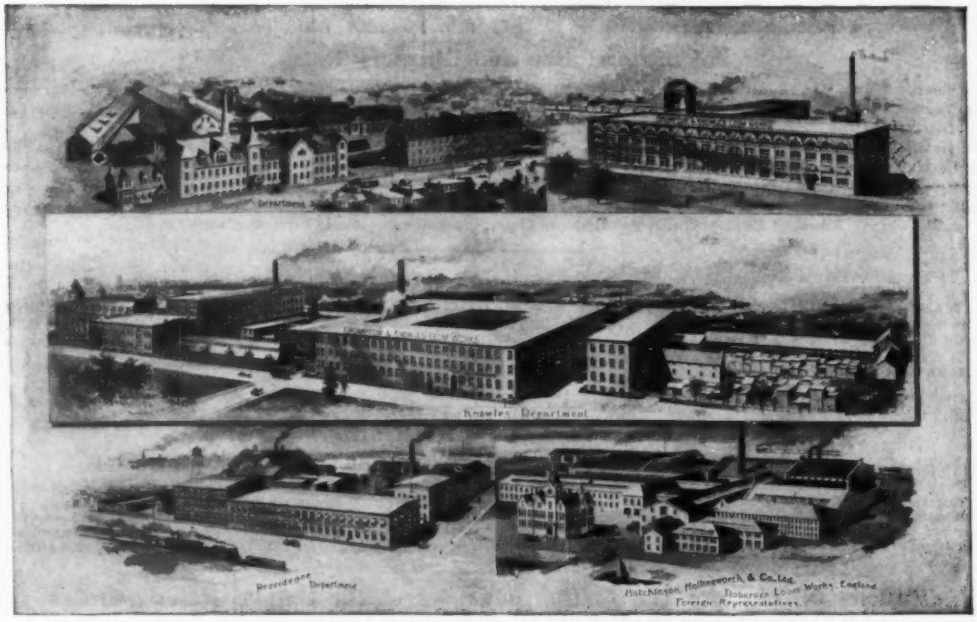

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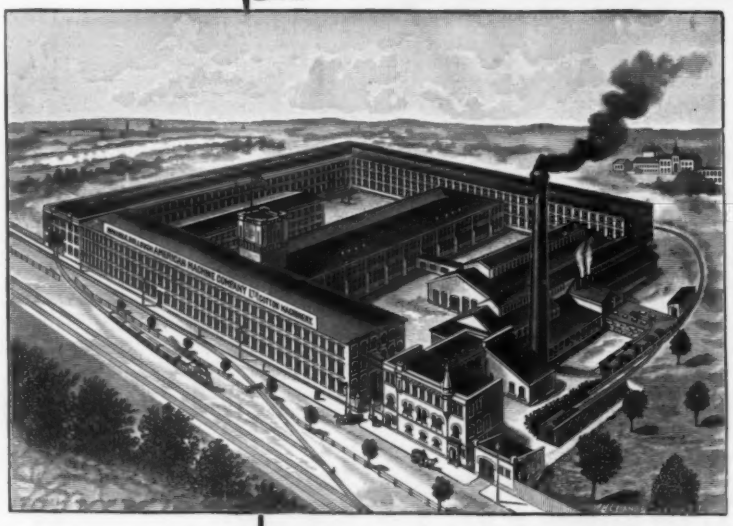

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VOL. 28. (NEW SERIES.) OCTOBER, 1904 No. 1.

Monthly Comment.

British Weights and Measures.

The recent efforts to secure legislation for the introduction of the metric system into the British Empire met with as complete a failure as some months ago overtook a similar enterprise in the United States. The metric bills were abandoned in both the House of Lords and the House of Commons after the Government had emphatically refused to endorse them and the adverse sentiment among the members had been plainly shown. The agitation, although apparently abandoned for the present, has led the opponents of the metric system to form the British Weights and Measures Association, whose objects are "the defense of British weights and measures and to fight the metric system." George Moores, F. S. S., has been appointed secretary and an office has been opened at 25 Victoria St., London, S. W.

Organized efforts to force the metric system on English speaking people by compulsory laws have been carried on for many years. The metric cause has had its association, which has professed to work in the name of reform and has diligently sought to cast discredit on the English system. Funds were solicited and literature consisting of ex parte statements has been freely circulated and in the absence of any statement of the other side has resulted in much popular misapprehension regarding weights and measures. This state of things continued without serious interruption up to 1902, when a plain statement of a few facts regarding weights and measures defeated the Shafroth bill at Washington and exposed the fictitious character of the sentiment in favor of a change in our present standards of measurement.

Cotton Goods in the Philippines.

The report of the imports of cotton goods into the Philippines during April, 1904, is more encouraging than for any previous month. As shown by the following statement, the United States stands second on the list. Let us hope that this exhibit marks the beginning of a movement that will end with this country in control of this important market.

Great Britain	40.76
United States	11.85
British East Indies	10.38
Switzerland	8.35
Spain	7.69
Germany	5.28
France	2.19
Other	13.50

Raw Silk In France.

In spite of the liberal bounty paid by the French government to producers of raw silk, the production of that commodity is steadily decreasing and the industry which supports thousands of people in different parts of France is threatened with extinction. The condition has become so serious that it is proposed to impose a protective duty on imports of raw silk into France. A bounty has been paid to producers of French silk for years and this is to be continued.

Of the 212,000,000 pounds of raw silk annually produced throughout the world only 1,320,000 pounds are raised in France. The official journal in supporting the proposition to impose a duty on imported silk asserts that there is no reason why the French output of raw silk should not be equal to the entire consumption in France. It states that a prolongation of the present depression will result in the extinction of the raw silk industry.

Silk is raised in the mountainous districts which are unfitted for other forms of agriculture. The present low price of cocoons has made the business unprofitable and silk farms have been generally abandoned by the people, who have gone to the cities and there still further overcrowd the labor community. Some of the reeling mills have been closed entirely and many of them are on half to one-quarter time.

Nearly all the imported silk comes from China and Japan. In 1880 Japan exported only 17,900 bales, while in 1903 the Japanese exports of raw silk amounted to 76,000 bales. The exports from China have increased in about the same proportion and today these countries are offering silk for $9 per kilo while the French producer cannot sell it for less than $10 per kilo. The cost of production in China and Japan is much less than in France owing to the much lower wages in Asiatic countries. In the Chinese reeling mills men are paid a maximum of 12 cents and women 8 cents per day. In the absence of any law regulating child labor in Japan, children are employed at from 2 to 2 1/2 cents per day. In France the wages of women and children are not less than 15 cents per day. The difference in wages paid in Asia and France is much greater than these figures indicate, owing to the fact that Asiatic countries are on a silver basis while in France wages are paid on a gold basis. One dollar in France is equal to two dollars in China and Japan. Thus the low wages in China and Japan must be reduced 50 per cent. in order to bring them to the same basis as those in France.

Our Use of Wool.

The report of the imports of wool for the year ending June, 1904, enables an estimate of the amount of this material used in this country to be made. For the period named the wool imports were as follows:

Class 1	45,575,993 lbs.
Class 2	12,934,143 lbs.
Class 3	115,232,698 lbs.
Total	173,742,834 lbs.

In addition to this raw wool there were brought into the country during the same period manufactured woolens valued at $17,733,788 as follows:

Carpets	$2,797,308
Clothing	1,309,995
Cloths	4,158,597
Dress Goods	8,205,835
Knit Goods	515,747
Shawls	54,084
Yarn	112,925
All other	579,297
Total	$17,733,788

This quantity of manufactured goods is roughly estimated as equivalent to 53,201,364 lbs., which, added to the weight of imported wool, gives a total of 283,860,934 lbs. of foreign wool brought into the United States during the year closing with last June.

As the imports of wool and woolens during this period were of average volume, being practically the same as for the two preceding years, the estimate may be taken as representing the actual consumption of imported wool at this time.

While there is much uncertainty surround-

ing the estimates of the domestic clip, we will assume it to be 125,000,000 lbs. On this basis the total annual consumption of all kinds of wool by the people of the United States amounts to 283,860,939 lbs., of which 44 per cent. is domestic and 56 per cent. foreign. Estimating the population at eighty millions the consumption of wool is 56 3/4 ounces for each inhabitant, 25 ounces coming from domestic and 31 3/4 ounces from foreign sheep.

Wages in Massachusetts Mills.

Statistics of wages have ordinarily given the full weekly rate and no data has been supplied regarding the amount of the actual earnings, which are always less than the full rate because of loss of working time. A weaver may be able to earn twelve dollars in sixty hours but if for any reason she works but forty hours a week her actual wages will be but eight dollars. Recognizing how misleading are statements of wages based on full time, Chas. F. Pidgin, Chief of the Massachusetts Bureau of Statistics, addressed a letter of inquiry to a large number of trade unions asking for statements of the actual earnings of their members. Blanks were supplied for each person, the name being withheld. The inquiry covered a large number of trades and from the reports of textile industry we have made the following extracts:

COTTON GOODS.

Occupation.	Males.	Females.	Hours per week.
Back boys	$ 4.87	$ ..	56.67
Beamers, Ballers, Winders	11.94	6.86	58
Card room operatives	6.63	6.45	55.42
Dye works operatives	8.95	..	57.57
Overseers	24.28	..	58.64
Spinners (filling)	8.71	8.82	58
Spinners (frame)	6.07	6.77	56.60
Spinners (mule)	11.72	11.53	56.04
Spinners (ring)	6.63	5.82	55.63
Spinners (warp)	8.19	6.96	58
Spinners	10.10	6.02	54.44
Spoolers	8.48	6.23	56.73
Weavers	8.68	7.86	56.87

WOOLEN GOODS.

Occupation.	Males.	Females.	Hours per week.
Back boys	$ 6.23	$ ..	58.82
Card room help	4.34	..	58
Dye house hands	7.08	..	59.55
Overseers	19.88	..	59.48
Spinners	11.19	..	58.35
Spoolers	5.71	6.71	56.86
Weavers	10.09	9.84	58.17

WORSTED GOODS.

Occupation.	Males.	Females.	Hours per week.
Carders	$ 8.42	$ ..	58.01
Dye works operatives	10.25	..	67.03
Overseers	25.07	..	57.45
Spinners	..	6.32	56.20
Spoolers	5.40	5.86	55.95
Weavers	10.31	10.29	56.43

The Consumption of Shoddy.

During the year ending June, 1904, only 218,618 lbs. of shoddy and similar waste stock was imported into the United States. This makes a striking contrast with that of the free trade years, 1895-96 and '97, when the imports of shoddy and other waste were as follows:

1895	14,100,000 lbs.
1896	18,700,000 lbs.
1897	49,900,000 lbs.

In other words the amount of shoddy brought into the country during the year just closed was less than 1/200th of the shoddy imported in the last year of the free wool tariff. This falling off in the use of imported shoddy is of course due to the practically prohibitory Dingley duty. It does not, however, represent the relative use of shoddy by American mills during the respective periods.

Shoddy is a waste product made practically from rags which are collected throughout the country, from tailor shops, manufacturing clothiers and by collectors who pass from house to house. These collections are made as long as the rags can be handled at a profit. When the price drops below a profitable figure the rags are not collected, but are allowed to go to waste. During the free wool period prices of wool stock were so very low as to make collecting unprofitable. When the duty was raised these collections were resumed and the domestic article was used to supply the deficiencies caused by stopping the imports of cheap foreign rags. It is thus seen that the importation of rags does not afford a basis for estimating the consumption of this material.

Suspected Undervaluation.

The Dingley duty of 44 cents per pound and 60 per cent. ad valorem on mittens has enabled a number of factories to be successfully operated in various parts of the United States, supplying the domestic demand for this class of goods. Although the duty amounts to 90 per cent. of the imported value it has not proved sufficient to prevent the importation of German goods. Recently the domestic manufacturers discovered that German goods were being offered to their customers at what appeared to be less than the cost of importation. An investigation of the matter has been made, but no evidence of fraudulent undervaluation has been disclosed. The low prices of the German goods may be a case of "dumping." The incident shows that even a 90 per cent. duty is none too high for protection against the cheap labor in German mills and the ingenuity of German merchants.

The Canadian Tariff on Woolens.

At the meeting of the Canadian Manufacturers' Association, held last month at Montreal, the following resolutions were passed, declaring emphatically for an increase of the tariff on woolen goods:

"Whereas the slight increase made at the last session of the Dominion Parliament in the net tariff on certain lines of woolen goods, is altogether insufficient to redeem the Canadian woolen industry from the serious condition into which it has lapsed, many of the mills being in a more hopeless and unsatisfactory condition than ever before,

"And whereas the general conditions of the industry have not improved since the slight increase has been effected. The competitors of the Canadian mills are reducing prices, which more than counterbalance the benefit of the tariff change, and the importations, especially in lines of cheap cloths, continue to increase,

"And whereas the greater difficulty is experienced in securing and retaining with wages available even a limited number of workers necessary to keep a part of the mills in operation,

"Therefore resolved:

"1. That the woolen section of the C. H. A. request the Association assembled in annual meeting, to bring the strongest pressure to bear upon the Dominion Governnment to grant a sufficient increase to afford relief.

"2. That this increase should be made at once if the industry would be saved.

"3. That it should apply not only to certain lines of woolen cloths, but equally to all classes of woolen goods manufactured in Canada."

The increase of the preferential tariff on British woolens from 23 1/3 per cent. to 30 per cent., made at the last session of the Dominion Parliament, has brought no relief to the woolen industry. Mills are closed or running short time at a loss while the volume of woolen imports has not lessened. Importers are visiting England and making contracts for future delivery as freely as before the change. This is not surprising because the increase amounts to but 6 2/3 per cent. ad valorem. It is difficult to believe that the Fielding Government actually expected any relief to result from such a change, especially in view of the fact that the experience of the United States has shown so clearly that British woolen goods can be kept from an American market only by a combination of high ad valorem and specific duties.

When America Spins the American Cotton Crop.

In the opinion of Europeans a cotton spindle in an American mill is as dangerous to Europe as a boll weevil in a cotton field. Both diminish the supply of cotton for European mills. It matters little whether the cotton thus lost to Europe was destroyed by a weevil or worn by a Yankee. The result to Europe is the same in both cases, and means extinction of the European cotton industry unless a new supply of the raw material is found. The fear of the increase in the consumption of cotton by American mills is thus expressed by Paul Bourdarie in a lecture at Marseilles, France, as reported by Robert P. Skinner, the American consul-general at that place:

The cotton question affects all Europe today. The world produces 14,000,000 bales of cotton, of which the United States alone contributes 10,500,000 bales, or 75 per cent. Moreover, Americans are attempting, with activity and persistence, to monopolize the consumption of the raw material which they produce, and to this end they multiply the spinning and weaving mills of their country, augmenting the number of spindles and installing their factories alongside the cotton fields. The consumption of American cotton in the United States grew from 2,287,000 bales in 1893 to 3,908,000 bales in 1903, and the progress appears to have been much more rapid since then.

It is evident that the French cotton industry is menaced by death within a brief period if means are not found to remedy this situation.

In order to supply the 6,150,000 French spindles and the 108,000 looms, the French cotton industry pays each year for the raw material necessary more than 300,000,000 francs ($57,900,000), which go to the United States, India, and Egypt. But even under these conditions, the French industry finds ways of maintaining its position.

It would be different should the United States succeed in consuming all the cotton which it produces. The 300 French spinning mills and the 650 weaving mills, besides the dyeing and finishing mills, would then have to close their doors, thus throwing into the street, deprived of the means of existence, 250,000 laboring people, and producing an economic crisis of which the consequences would be disastrous.

This danger may be met very simply by the full utilization of our colonial territories naturally adapted to the cultivation of cotton. The French colonial domain is vast and varied, and in most of our colonies cotton grows spontaneously. The other great European nations, under the same menace, are making efforts to escape the danger. Russia has cotton fields in Turkestan, the production of which is being increased by every means. England possesses India and Egypt, but the cottons produced in these countries are employed for special purposes. The British domestic industry would see itself similarly doomed if England had no other territories. She has found them in western Africa, where she pursues experiments giving hopes of success. Germany is making similar experiments in various African colonies, and particularly in Togo and Kamerun.

Three of our colonies at this time are particularly favorable to cotton enterprise. They are Sudan, Dahomey, and Madagascar and its dependencies. After a long and careful study of the question, the Colonial Cotton Association has defined its program as follows:

(1) To develop and perfect the culture of cotton in the colonies where the natives lend themselves to it, and in all those where this textile is found.

(2) To study the modes of ginning and pressing compatible with the nature of the cotton and local resources.

(3) To study the means of transport, and to endeavor to cause them to be increased and cheapened as much as possible.

(4) To engage the growers to ameliorate the quality of their product by buying better varieties, and to aid in the creation of purchasing centres.

(5) To distribute selected native seed or exotic seed in villages, in order to obtain more highly improved species.

Mercerized Cotton Goods.

An encouraging report comes from Glauchau, Germany, to the effect that the demand for German mercerized cotton goods for export to America has almost entirely ceased and that this is due to the fact that American buyers after examining the German product have concluded that better goods at more favorable prices can be obtained from American mills. The American consul at Glauchau states that samples of the American goods have been sent to that place and that German manufacturers realize more than ever before the formidable character of American competition in this line of goods.

A Dying Industry.

Canada is slowly learning from her own expensive experience a lesson that she could have learned without cost from the past experience of the United States, that the woolen industry cannot exist in America under an ad valorem tariff of 30 or 40 per cent. The practical abolition of the British preference on woolen goods some months ago has not helped the woolen mills. The woolen tariff is now only 30 per cent., and the difference between the old and new rates is so slight as to be negligible. Even if an adequate specific duty had been imposed the enormous stock of cheap English goods now in Canada would alone have been sufficient to delay for years the revival of the domestic woolen industry.

The general curtailment of production and bankruptcy of leading Canadian mills forced the Government to abolish the preference to British goods some months ago. Failures and shut-downs have continued without interruption, the latest case being the closing of the Excelsior Woolen Mills of Montreal, whose officers thus express their opinion of the situation:

"The Government has almost succeeded in killing the Canadian woolen manufacturing industry," one of the officers of the Excelsior Company said yesterday.

"Conditions at present are simply strangling, and we look for them to become much worse.

"True, the Government did make a slight favorable change in the tariff, but so slight that it is practically of no benefit whatever.

"All along, orders have been so small, and outside competition so keen that we have been barely able to keep our hands employed.

"With the protection we have now it is the most difficult thing in the world for Canadian woolen mills to compete against imported goods and exist.

"And this is not confined, this depression, it is general in Canada, wherever there are mills."

The president of another Canadian woolen mill, which is still running, but evidently about to fall under the free trade guillotine, thus confirms the preceding statement:

"There's got to be a change and a radical one," he said, "if we are to exist. It is unquestionably killing the woolen manufacturing here, this tariff, and it is a fact that conditions are becoming rapidly worse."

Seasonable Fabrics.

MEN'S WEAR WOOLENS.

The initial purchases on Spring fabrics are now completed; hence this is the period for retrospection and a general summing up of what has been accomplished, and the trend that the market has taken. On the whole the agents express themselves satisfied with the volume of business booked, and there is no doubt that the situation is very encouraging. Most of the first-class mills are well sold up, more especially those that have devoted their looms on mercerized and fancy worsteds. It was predicted that this fabric would receive strong support, but the orders booked are more than expected; it, however, remains to be seen whether it will be equally satisfactory to the wearer and the clothier.

What may be termed the feature of the month, has been the advance of the American Woolen Co. of 5c. on all its lines of light weight goods. This was followed by a number of the other mills, with a general tending to a higher level. This advance seems logical and justified by the advance of raw material, and the probabilities are that wool will remain higher for some little time to come. Several lines of light weight fabrics such as crashes and homespuns, have not been received with the same favor as last year; while serges have maintained their popularity on a parity of last year's business.

Duplicate business on heavy weights, more especially fancy overcoatings, are now coming in with some degree of liberality, and stocks are spoken of as being considerably depleted. This fabric is spoken of as being well positioned ,and its success for the belted overcoats promises to be the most popular style of the current season; another fabric that has well maintained its own is the cheviot. This has become a staple and always in demand. Trouserings have been bought for fall to exceed the record of last season.

Some of the mills that have advanced their products are the following:

The Aetna has advanced all serges and worsted cheviots 5c. per yard.

J. & J. Dobson have advanced clays, worsteds and serges 2 1/2c.

Stevens, Sanford & Jordan have advanced Farwill mercerized worsteds 7 1/2c. a yard.

Theodore Howard, selling agent for the Crown Mills, announces an advance of 5c. per yard on the Chester Moses fancy suitings and 5c. on the lower grades of the Blakington fancy suitings, and 7 1/2c. on the higher grades.

DRESS GOODS.

Conditions are spoken of as having materially improved on spring business in domestic fabrics. Jobbers have placed good sized orders for plain staple goods and are demanding supplies for their road men. No great change developing into the popularity of any one particular weave has taken place, with the exception that broadcloths have forged somewhat to the front, and is without doubt the material in favor for general use; some difficulty has been experienced in supplying the customers' requirements. Although some of the leading cutters have placed considerable business for fancies, the trend of the demand is decidedly in favor of plain goods.

Jobbers and cutters who supply the popular trade are of the opinion that the spring season will turn on plain lines. The new lines contain many attractive and novel features which should go far toward creating an active demand when the season is fully under way.

The most popular color is brown, from the darker shade of golden brown through the burnt onion, leather and copper shades to the paler biscuit tints. The coming vogue of green is also to be noted in all the early displays of imported costumes. Bronze green is now the most popular shade with the dressmakers. Some doubt is expressed regarding the position of cream and white dress goods and it is stated that the ultra trade is paying less attention to cream than is the case with some of the light neutral shades and tints.

In thecollections displayed for the spring season mohair plays a very important part, and authorities in the trades state that the lines of these fabrics now on view are the

most extensive ever placed before buyers in this country.

In plain fabrics, outside of broadcloth and mohair, the manufacturing trade is showing a tendency towards close shear fabrics, on the wool crepe, etamine, and voile order, such as have had a steady call for the last two or three seasons. These are recognized by the trade as staple goods and little hesitation is shown in purchasing this class of fabrics. For evening wear and house dresses, wool crepe de chines and eoliennes are strong favorites, also light weight broad cloths, silk warp worsteds, batistes, veilings and allied lines are largely used.

SILKS.

The situation is probably as encouraging to day as it ever was, and the volume of business transacted as large as at any other previous season. Still we hear complaints that a number of looms are idle and the margin of profit small with competition keen, and yet it is acknowledged that this is a silk season. The demand for fancies has continually improved. Printed warps and novelties of all kinds receive strong support among the best trade.

"Chameleon" effects although only recently produced have met with marked success, and glaces are being revived both in printed warps and solid two toned effects. "Chameleon" possesses three distinctive shades, two in the filling and one in the warp, while the ordinary changeable or glace has but one shade in the filling and another in the warp.

In plain materials much interest is centered in chiffon taffetas and other soft finished weaves. Louisines are also considered strong owing in a measure to the fact that many of the newly imported costumes are made of this fabric, several new shades having made their appearance. The most prominent are burnt orange and burnt onion in a variety of tints, with ombra effects in the foregrounds; bronze green and copper color are considered good.

The demand for yard wide black taffetas is up to the average, and a revival in the request for peau de soies and peau de cynges are in evidence. Plaids in desirable designs have sold in large quantities until the market is depleted of good styles.

Velvets have developed into a strong position more especially broad-tails and the crushed variety, both for costumes and for millinery purposes. Chiffon velvets in the new brown and olive tints are exceedingly scarce for immediate delivery.

COTTON GOODS.

The trend of the market is very uncertain owing to the erratic movement of the market for raw material. The manipulative activities of certain large speculators have also helped to cause this erratic series of fluctuations. Cotton goods buyers watch these movements with some degree of apprehension and admit that they furnish strong reasons for the continued firm position of the agents. Notwithstanding the fact that agents endeavor to maintain prices some weakness has developed with the result that a number of well known tickets have been reduced, in ticks, denims, and ginghams, as well as wide sheetings and 4-4 bleach goods. It is authoritatively stated that no further concessions will be made during the next three months. An argument for the continuation of present price level is the fact that China has been operating with unusual freedom having placed orders to the unprecedented amount of 300,000 bales since last April, with a further business to follow.

The spring lines of wash goods are not yet complete, but it is predicted that printed organdies and sheer fabrics will predominate in the demand.

LININGS.

The situation is spoken of as being normal, which means that the market is sluggish and that no activity has developed during the month. It is true that there has been a movement of considerable dimensions in low and medium grade silesias, with mercerized finished goods maintaining the usual proportions at this period of the year,. Kid finished cambrics at 3 1-2 cents and 3 5-8 cents have had a little better request. The clothiers have also placed orders for cotton Italians and twills, but were it not for the fact that converters have introduced specialties on the order of low grade taffetas their position would be untenable.

PLATT BROTHERS & CO.'S EXHIBIT AT ST. LOUIS EXHIBITION, 1904.

(Specially written for the Textile World Record.)

There are few exhibits of textile machinery at the Exposition, and none of cotton spinning machinery except that of Messrs. Platt Brothers & Co., Limited, of Oldham, England, whose American agent is Evan Arthur Leigh, 232 Summer St., Boston, Mass. This is a very fine and complete set of cotton spinning machinery. It occupies a floor space of 80 feet by 60 feet in the Varied Industries Building and employs ten people in its working and management. The exhibit is neat and very attractive in design and completeness, the light parts of the machinery being in good contrast to the remainder, which is without exception painted black. This may be said also of the pillars which support the shafting driving the machinery as well as the pillars which support the outer rails of the office in the centre of the stand, which is painted bright black and lined with gold and of the photographs of machinery framed and hung on the screen at back of the stand.

The machinery is in full operation except that the picking or scutching and carding processes are in operation only a very limited time during the day owing to the large capacity for production in this preparatory machinery. The machines are run from 10 to 12 A. M. and 1 to 5.30 P. M every day and strangers need be at no loss to locate them as the hum of the opening and scutching machines, the steady beat of the combers, the cricket-like sounds given out by the speeders, the whistling and bumping in and out of the self-acting mule carriages are sounds well known by the cotton mill expert and at once attract him to the spot.

Within the rails are very complete illustrated catalogues with a plan of the installation and description of the details. These catalogues, by the way, are printed in English, French and Spanish, to suit the customers or visitors, who are world-wide, from Europe, Asia, Africa and America.

One can realize the high state of perfection evidently attained in this exhibit after being informed that the firm has made a specialty of machinery of this class since the year 1821, that they are by far the largest textile machinists in the world and that their works when busy employ about 14,000 people, producing each week some 40,000 spindles with the preparatory and weaving machines to follow. Their line is so complete as to supply everything required for a complete plant of cotton spinning, preparing and weaving machinery.

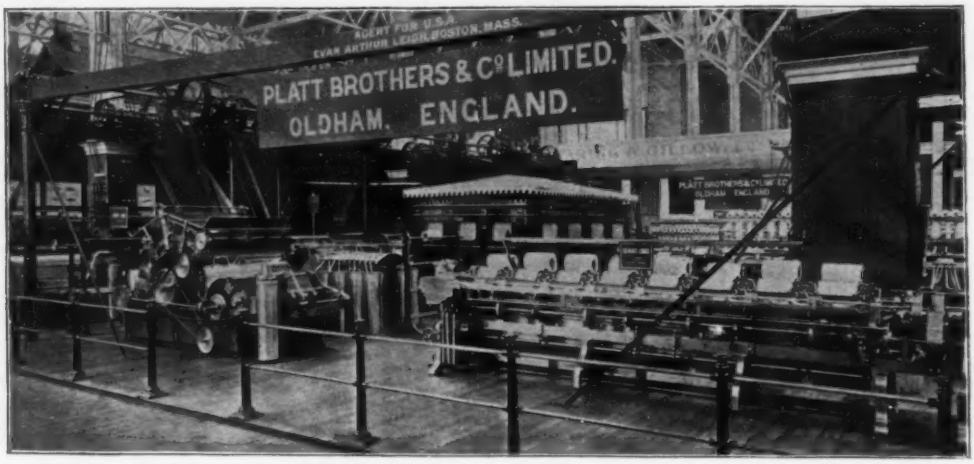
The town of Oldham, where the works are situated, may be said to be the "Hub" of the cotton spinning industry. Within a radius of seven miles there are some 15,000,000 spindles, mostly equipped with machines from these works. The works are very closely in touch with the operatives who from time to time come for articles to replace breakages. These spare parts being made in duplicate and in template sizes, it is neither necessary nor usual to keep a mechanic at any of the mills. This is mentioned to show the degree of accuracy which is obtained in this duplicate system. The gentleman in charge of the exhibit, Arthur J. Holt, has three assistant erectors or fitters, each of whom has been in the service of Messrs. Platt from boyhood and has an intimate knowledge of his special department.

The exhibit comprises a complete set of machinery necessary for ginning, preparing, combing and spinning American cotton of medium staple, as well as Egyptian or cotton of similar long staple. At the time of our visit the machines were busy spinning 20's warp and 18's weft or filling to be woven into cloth in a St. Louis mill, 30's hosiery yarn in mule cops for a mill in Philadelphia and 120's weft mule cops for putting into fine cloths in a Connecticut mill.

The three gins shown are of different patterns. These do not properly belong to a cotton mill, but to the farm or plantation. They are all of the roller patterns, a system generally in use for long staple cottons and are suitable for ginning all grades where it is desired not to injure the staple or allow seeds or other impurities to pass into the ginned cotton.

The first process of a cotton mill exhibited is the hopper bale breaker, around which several bales are placed. The attendant

feeds it with large lumps from each bale. It is thoroughly opened by the spiked lifting lattice and the combing cylinder, then passes on through the hopper feeder, the Creighton opener and the dust trunks to the exhaust opener and lap machine. This brings the cotton direct from the bale to the lap without handling, a modern combination that shows considerable economy in floor space and in labor. If required and if the cotton is clean, by means of valves it will go through a by-pass and not through the Creighton opener. There is also in direct connection with the cotton, such as Egyptian. The former card has 106 narrow flats and the latter has 90 wide flats. These cards are 45 inches wide and some noticeable improvements are the methods by which the stripping plates and flats are strengthened to give the necessary rigidity and inflexibility. The provision of five setting points to the flexible ends, the cleanliness of the card and the freedom from side waste, the coolness and cleanness of the licker-in ends were particularly noticeable, also the slow speed motion to the doffer with an automatic arrangement to put it into full



A VIEW OF PLATT BROS. & CO.'S EXHIBIT AT ST. LOUIS.

exhaust opener fan, a pipe from the roving waste opener. This is an admirable arrangement by which the roving waste is opened and fed at a very slow rate on to the good cotton which comes along the larger pipes from the hopper bale breaker. As there is no mixing the labor usually employed to do it is not necessary, and the floor space usually required for the mixing can be put to better purpose.

Four laps from the opener are put behind and on the lattice of the single scutcher which with its plain feed regulator produces even, regular laps of about 14 ounces per yard or whatever may be required for the numbers to be spun. The finished lap is then taken to the carding engine, of which there are two patterns, one for staples of the ordinary American variety, the other for long stapled speed. There are many other details worthy of note but these may suffice.

Next follows the drawing process, six cans being put behind each set of four draft rollers and drawn six times into a sliver of equal thickness with those from the card. This process is repeated three times and results in a sliver quite straight and parallel, with fibres evenly laid. Among the noticeable features of the drawing frame is the very low pattern of framing. The Ermine patent self-stripping clearers, the very simple but effective front, back, and full can stop motions, the automatic locking apparatus to the guards over the toothed gearing, the pipes covering the revolving undershafts and other details are all worthy of special attention.

For the longer stapled cottons and the finer qualities the combing process is shown. This

consists of a lap doubler, which takes 20 cans from the card and draws and amalgamates these into a lap 12 inches wide.

The Heilmann patent comber receives 8 laps each 12 inches wide, equalling 160 slivers from the card and at a speed of 92 nips per minute combs and straightens the fibres, depositing the combed sliver into one can, and the noils, which vary according to conditions, are dropped into cans behind. A noticeable feature of this comber is the solidity of its construction and the steadiness with which it works, the production of first-class combing during our visit being 12 pounds per hour. In combing it is necessary to have the leather covered roller as nearly cylindrical as possible, and to aid in this direction the machine is fitted with an apparatus by means of which all the pressure is taken off the rollers by a turn of a handle. At the time this is done the strap jack is locked so that the machine can not be run until the weights are again allowed to press on the rollers. Special arrangements are embodied in the machine to reduce the tension on the rollers, which are unusually long, owing to the large number of deliveries.

After the drawing process the cans of sliver are taken behind the slubbing frame, each being drawn through the three draft rollers and elongated and twisted as it is wound on the bobbins. The intermediate frame receives two slubbing bobbins per spindle and the roving frame receives two intermediate bobbins per spindle, each process further attenuating the threads until at the fine rover it is reduced to 16 to 25 hank according to the yarn required. The slubbing, intermediate, roving and fine roving frames are alike in the work done and differ only in the size of the full bobbin produced, these being 12×6, $10 \times 4\ 3/4$, $8 \times 3\ 5/8$, and $6 \times 2\ 1/2$ inches, respectively. The fine rover is, however, only used for the combed and finer yarns. The differential motions on these machines are brought to a high state of efficiency, being so finely adjusted that the periphery speed of the bobbin from receiving its first layer to the full bobbin is practically the same, consequently the material is wound on layer after layer at a regular tension. Noticeable improvements in these machines are in the automatic locking doors which cover the whole of the gearing behind the differential motion. These doors can not be opened while the machine is at work, nor can the machine be started while the doors are open. Hilton's patent automatic stop motion and other details are worthy of particular attention.

The roving or fine roving bobbins, as the case may be, are placed in the creels of one of the spinning mules or of the ring spinning machines, depending on the purpose for which the yarn is required. There are two

A VIEW OF PLATT BROS. & CO.'S EXHIBIT AT ST. LOUIS.

types of mule at work, one spinning large cops for number 30's, 68-inch stretch, at a speed of five draws per minute and with the roller delivery as carriage runs in delivering about 71 inches of yarn each draw. The other mule spinning 120's weft combed Egyptian at a speed of three draws, 60-inch stretch, per minute, plus roller delivery motion. There are many details in these mules interesting to the technical man, but which are too numerous to notice within the limits of this article. We cannot, however, fail to remark upon the excellent character of the spinning in both mules, the fine yarn, 120's, spinning remarkably well. The improved apparatus to adjust the speed of the spindles as the carriage completes its inward run is one of the latest and most valuable improvements. The mules are most efficiently guarded over all dangerous places, such as roller gearing, back shaft scrolls, faller stops, carriage rails or slips, etc., so as to reduce liability of accident to workpeople to a minimum.

Of the two ring frames at work, one spins 20's warp yarn with a parallel build front roller speed 160 revolutions per minute, indicated spindle speed, 8,600 per minute.

The weft frame was spinning 18's on pirns for the shuttles of the looms and having an electric Westinghouse motor and suitable rheostat, the speed at which the spindles ran was varied between 6,500 and 8,500 in an instant to suit the quality of yarn being spun.

One of the frames is equipped with L. T. Houghton's metal thread boards, the other with the ordinary wood board. The attractive and substantial appearance of the metal board, its rigidity and the ease with which it is kept clean appeal to the practical men who have heard so much about it and who have here an opportunity of seeing it under mill conditions and side by side with good wood boards, so that its advantages are apparent.

Show cases of spindles, flyers, rollers, combs and other details of the machinery, all of which are made at the Oldham works, help to complete a most remarkable and interesting exhibit, special attention being directed to the excellent finish and duplication of all the details of the machinery. The casehardened rollers, the casehardened pulley shafts, rim shafts and attention to the quality of each detail subject to wear and tear, show to what state of perfection the machines have been brought, and to which the situation of the works in the midst of the cotton industry has contributed to a very large extent.

The warp ring frame has two 10-inch clear tin rollers or drums and is the system preferred in all countries, except the United States. It presents several advantages, such as a slow T. R. speed, bands going to and coming from the spindle warves in a straight line, and a long durable band. The weft ring frame has 1×7-inch T. R. as preferred in the United States. Other features are the low pattern Birkeshead patent creel, top rollers, front line only weighted, without either lever or saddles, and a remarkable spindle, Dodd's patent, in which the oil is put in at the front and the dirty oil pumped out at the same place without it being necessary to remove any of the running parts, a spindle which runs in a bath of clean oil above the chamber in which the dirt settles.

Comber Board. Hugo Lewohl, Bergamo, Italy, has recently brought out an adjustable comber board for jacquard motions. It consists of an upper and a lower board, each of which is adjusted by a shear frame similar to that used on linen warpers for expanding and contracting the reed. It is said that the new board has been thoroughly tested with very satisfactory results in Italian mills.

Mule Driving Motion. R. S. Heap, Burnley, England, has recently produced a new method of driving mule cylinders. The chain drive is substituted for the ordinary rim band. Comparative tests of the chain and rope drives have been made in a Burnley mill. The mule with the chain drive turned off 5 per cent. more work and the yarn was more uniform in twist and appearance. It is claimed that the new drive will produce finer and stronger yarn from the same roving. The owner of the mill where the test was made has ordered all his mules to be equipped with the new drive.

According to the census of 1900 there were $81,000,000 invested in the silk industry in the United States.

A NEW UPHOLSTERY GOODS MILL.

The illustration shows the new establishment for the manufacture of novelty upholstery goods and draperies adjoining Frank Bailey's works at Braddock, Camden Co., N. J. It consists of a weave shop large enough to contain twenty broad looms and necessary auxiliary machinery, also a complete boiler and engine house separate. The plant is so planned that when extensions are necessary, they can easily be made, and the power house can supply the needed power.

THE BAILEY & STEEL MFG. CO.'S NEW MILL.

Frank Bailey, the well known manufacturer of dye sticks and yarn drying machinery, is the president and treasurer of the new enterprise, which will be known as the Bailey & Steel Manufacturing Co. Arthur J. Steel, who has had a wide experience in this line of manaufacture and who is a graduate of the Philadelphia Textile School, is the manager and buyer, and Ben Bailey is the secretary. At present they buy their yarn all dyed.

When Mr. Bailey first located at Braddock, or Cedar Brook as it was then called, and where the post office now is, there was nothing but the woods. He cleared his land and started in a modest way manufacturing dye sticks, with which specialty his practical experience in the dye house made him thoroughly familiar. He gave personal supervision to all details of the business and sold most of the goods himself among the mills. Little by little the business has grown, as the merits of his goods and his straightforward methods of doing business became known.

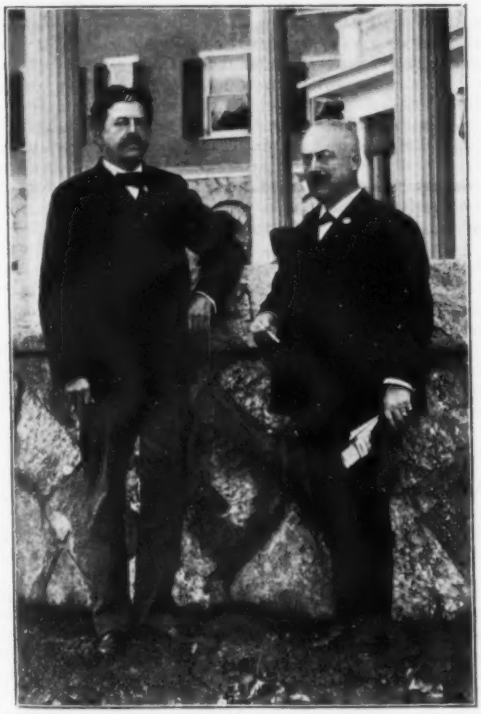
Later on quite a side line was developed in the manufacture of base ball bats. Then came the development of the cold air drying machine for yarn, followed by the hot air yarn dryer where large capacity was wanted.

The new addition is still another and quite a different branch, but every step has been carefully taken, and there is good reason to predict the same success that has accompanied his other enterprises. The picture does not show the wood working shop, which is on the other side of the mill.

Formerly asbestos was mixed with flax before spinning, but now it is spun direct into yarn after having been softened with hot water and the fibres separated by passing through a crusher.

Meeting of the New England Cotton Manufacturers, Bretton Woods, N. H.

The semi-annual meeting of the New England Cotton Manufacturers' Association was held on Sept. 21, 22, at the Mount Washington Hotel, Bretton Woods, N. H. After the meeting had been called to order by Secretary C. J. H. Woodbury, President Walmsley delivered his address, the large audience listening to him with close attention.



PRESIDENT WALMSLEY AND SECRETARY WOODBURY.

President's Address.

HERBERT E. WALMSLEY, New Bedford, Mass.

Gentlemen of the New England Cotton Manufacturers' Association, ladies and gentlemen:

In rising to address you upon this occasion, it affords me much pleasure on behalf of the Board of Government to extend to you one and all a most cordial and warm welcome to this the Seventy-seventh Convention of our Association. At the same time, I venture to express the hope that our coming together may be mutually agreeable and beneficial. I need hardly say that these semi-annual meetings have a value far beyond that of the sessions, for the conferences and acquaintances formed between members lead to the most advantageous and pleasing affiliations.

And once again it is my privilege to bear witness to the fact that the vitality of the organization is so largely due to the untiring efforts of Mr. Woodbury, secretary and treasurer.

Gentlemen, from the fact that of late there has been so much said and written regarding the present condition and future status of the cotton manufacturing industry of New England, I have thought it well and opportune to devote my entire address at this particular time to what must necessarily be a brief but none the less, serious consideration of certain important and vital factors bearing upon this question, and to which I now ask your attention. At the same time permit me, in all sincerity, to express the hope that whatever discussion or criticism my remarks may perchance call forth; the ultimate outcome of our deliberations today may be of some benefit to the great trade in which we all of us directly, and so large a part of the community of New England indirectly, have such deep concern, so very much at stake.

First and foremost of all questions for consideration and elucidation in connection with our inquiry, is without doubt, the so-called labor question; the standard of prosperity of the cotton trade in New England, depending so largely upon the presence or absence of a correct and good understanding between employer and employed.

At the annual meeting of this Association, held in the city of Boston in the month of April, 1901, in a paper which I then read upon "Industrial Unty" I remarked that this momentous question was a perfectly legitimate topic for all to discuss and strive to realize, further suggesting that it was incumbent upon us, one and all, to endeavor to put forth the means best adapted for bringing about a fair and equitable settlement of the disputes dissevering capital and labor,—adding that in proportion as these matters were so decided, would the work of the nation prosper and the condition of the people improve.

In the spirit in which the concerns of a great industry ought to be conducted, and on the principle that we are totally and absolutely opposed to strikes and lock-outs, favoring on the other hand an equitable adjustment of all differences between employer and employed by conciliation or any amicable method that will preserve the rights of both parties, I do not hesitate as president of this Association to again submit that the question of industrial peace is a perfectly legitimate topic for investigation and discussion by this Association. At the same time, let me say that I am not unmindful of the fact that one must expect to have one's motives scrutinized and one's every word sifted with no ordinary jealousy and with no sparing criticism, when attempting to deal with the subject.

As you are aware, the cotton trade of this country

is one of the very important, if not the most important, of our great staple industries—some millions of our population being directly or indirectly dependent upon it. Its dislocation or stoppage brings in its train every kind of disaster without parallel; its prosperity is the guarantee of comfort and well-being to an enormous section of our people and is to be earnestly labored for.

Is there any man who does not see the extent of the burdens placed upon the industry and the community through the disastrous and ever-recurring conflicts between employer and employed, with their desolating effect destroying as such conflicts do, hundreds of thousands of dollars of capital taken from the profits of the mills and the thrift of the workers, benefiting our competitors to the lasting and permanent injury of New England, imperiling the very existence of the trade.

Is there anybody who does not think that it is the first and foremost duty of every one in authority to examine most closely all the various bearings of so vital and complicated a question, involving as it does such great industrial and commercial considerations?

Is there any one who does not acknowledge that it is a matter of intense concern to all of us that the smooth working of the great cotton manufacturing industry of New England should, if possible, be ensured? Surely not! Let us then endeavor to infuse the genius of common sense into the question, and not scarcely more than the discernment of an ordinary school-boy.

Is there any one among us, any employer of labor, who does not fully realize the absolute necessity of harmonious co-operation and combination between employer and employed? Who does not recognize the fact that the road to trade prosperity lies through the region of mutual understanding?

There is small need to point out or recount reasons which demonstrate the evils of strikes or lockouts; at best, they are a clumsy, uncivilized, and outrageous remedy. The pity is that such occurrences so often become inevitable. We can ill afford these wretched conflicts, entailing such severe loss upon capital, and such untold misery and suffering upon labor: these "fights to a finish" jeopardizing the every existence of the cotton industry are to be deprecated and discountenanced, dislocating the trade and driving much of it into the hands of our competitors. Recognizing, therefore, to the full, the dangers of future strife, provision should be made for the settlement of disputes, in an amicable and broad-minded manner.

A trade quarrel is an occasion, not for a mere display of endurance, but for argument, for statistics, for careful investigation of facts and principles, there must be union if the cotton trade is to prosper.

All must admit the desirability of conciliation in place of the violent methods of the past; the evolving of some definite method of adjusting disputes which would preclude the possibility of extreme measures and even make disputes a remote possibility. The common sense, no less than the common interest of both parties, should supply any want so far apparent. Let both sides do what they can to agree upon the principles upon which they alone are competent to speak.

With a reasonable security against strikes and lock-outs over long periods, the possibilities of a permanent return upon capital would be more stable than they are at present; panic competition would be checked, and the maintenance of our markets rendered more secure; more capital would thus be attracted to the industry with added security for investment; production would be strengthened with beneficial results all around.

The matter is one of public concern and it should, therefore, be the great effort and aim of all alike to establish a permanent industrial peace, so that united we may all the longer withstand the unequal competition of longer hours and lower wages and preserve for New England the inestimable advantages of the great cotton manufacturing industry that has served New England so long and so well.

Is there any one holding any position of authority and responsibility in our great hives of industry who is not prepared to concede and admit that labor in asking for what is moderate and just, in asking for what is necessary for the protection of its interests without inflicting unnecessary injury, upon capital, is not perfectly within its rights?

Let us without reservation concede to labor, its legitimate and indisputable claim as an important factor in the situation. It is incumbent on each to respect the rights of the other, for both have their respective rights. Do not misunderstand or misinterpret what I say in this connection.

The point desired to be made is, that there must be combination of purpose between employer and employed, that the laborer is worthy his hire, that labor is entitled in all eqnity and expediency to as fair and full a return as circumstances permit of.

I desire again, however, to emphasize in the most unqualified manner possible that in so far as the management and direction of our industrial corporations is concerned, the managers alone at all times and under all circumstances must manage and direct, must not concede one iota of their prerogatives or responsibilities to any outside influence whatsoever; the vitality, the effectiveness, the success of the industry depending upon this all important and vital principle, which must be maintained and insisted upon absolutely, and without question.

With respect to the hours of labor in the cotton mills of New England and the rate of wages to be paid the operatives. As regards the former, the hours of labor, or the working hours per week: fully realizing the force of Southern competition, and its daily increasing severity, it is perfectly plain that the cotton industry of New England, in view of this rapidly increasing competition, cannot afford to have its power of successful competition further weakened by reducing the hours, or having any further burdens whatsoever imposed upon it. There can be no two opinions as to this—on the other hand, however, it is equally perfectly plain and certain that the working hours in the New England workshops and factories cannot and will not be increased beyond the present legal and lawful limit. No retrograde movement of any such character is possible in this twentieth century, no matter by whom contemplated or thought of. Any suggestion of this nature may be at once dismissed without further words or consideration.

As to the rate of wages—far better look this problem squarely in the face also, and equally,

freely and candidly admit that the standard or normal rate of wages in the New England cotton mill never can nor will be brought down to the level of the Southern standard. The difference in the cost of living, alone, between these two sections of the country, makes such a thing impossible. I do not hesitate to say, in the most emphatic manner, that in my judgment, any such reduction or leveling down is neither desirable nor necessary. Rather should we aim for higher standards in the interest of the general well-being, advancement and prosperity of the entire community, regarded from any and every point of view. The real and true self-interest of the employer will not permit of any forced and continued attempt to reduce wages below a normal or legitimate standard. Any forced attempt to impose artificially low prices upon labor must inevitably result in failure from the simple fact that whenever or wherever such an attempt is made, a gradual but steady exodus of the operatives will immediately set in or take place—such exodus being from the most intelligent and desirable class of help—which emigration again will not stop until the normal or legitimate rate is restored or approximated, the inevitable equilibrium reached. The logical result, the only outcome, the inexpediency of any and all such attempts is self-evident and could not possibly act otherwise than as a boomerang, doomed, as I have already said, to failure from its very inception, of this the operatives themselves may rest assured. Common sense —the genius of mankind—teaches this.

Good wages are not incompatable with our position in the world's market—such at least is my deliberate judgment of this delicate and vexed question.

As regards the labor cost of productions, we all know that the labor cost of weaving is in the neighborhood of one-half the total labor cost in the entire process of manufacturing cotton cloth. It is necessary, therefore, and admittedly so, in our efforts which must ever and always be unremitting, in legitimately bringing down the cost of manufacture, to pay the closest attention to this particular department of cost, and in this connection it would appear pertinent to inquire whether or not we have in New England, as a whole, taken sufficient advantage of the warp-stop motion, and of a certain wonderful, automatic, almost human, labor-saving machine, invented and built right in our midst, known as the Northrop loom. I speak plainly. Or have we permitted our Southern friends, as a whole, to get the better of us in adopting this machine more readily than we ourselves have done? I fear many of us must admit such is the case. Nothing is more certain than that it will have to be reckoned with and of which the least observant among us must be convinced. It behooves us, therefore, to see to it that we put our houses in order with as little delay as possible, and if there are any of us whose financial condition is such that we are unable to install this loom, we must either go to the wall or so re-arrange our financial affairs so as to enable us to equip ourselves equal to the best in every particular. If ever there was a time in the history of the cotton trade when alone it was "the survival of the fittest," that time is right now.

This phase of our inquiry, and the remedy, where remedy is called for and needed, is plainly apparent and will admit of no evasion or delay.

Again, why is it that on the one hand many of the oldest established mills in New England are today in good physical condition and equally strong financially, thereby enabling them to successfully meet all competition, even the competition of the most modern mills, in the production of the finer yarns and fabrics of superior textile quality and design, when on the other hand so many of the older mills are neither physically nor financially able to meet the changed conditions and requirements of today? It is self-evident that the managers, no matter who they may be, are alone responsible for this deplorable state of affairs. Let us be outspoken in the matter and place the responsibility and the blame where it belongs. It is high time to speak plainly and without equivocation, the time for smooth words and evasion has gone by. Where conditions have arrived at such a pass, that is, where mills are in such an unfortunate and unenviable position that they cannot any longer be run with any degree of profit, let them close down and go out of business altogether and the sooner the better. They are nothing more and nothing less than a demoralizing and disturbing element in what would otherwise be a healthy, vigorous and satisfactory situation. Mills of this undesirable character, and unfortunately it is to be feared there are too many such in New England, could not compete with the well-equipped southern mills, even were they to pay the same wages and run the same number of hours, from the fact and for the simple reason that their machinery is antiquated, fit for little else than the scrap-heap. They are in no condition to meet any kind of competition on any class of work, or under any circumstances. In the face of it on their own admission they cannot compete with their wornout, obsolete machinery, barely able to make even the cheap low-grade goods they have so long and so blindly persisted in making and still continue to make and for which there is not a sufficient demand at anything like remunerative prices. No such short-sighted policy can nowadays succeed in New England, or anywhere else for that matter. If today the management of any individual mill or of any particular group of mills in New England will still persist in the production of such yarns and fabrics, in which particular line of product competition is the keenest, and margins are the narrowest, they inevitably invite defeat and disaster, which they can alone expect and will surely encounter. If again the cotton industry of New England or any particular section of the industry has arrived at such a pass, such a stage in its history, that all that can be done in the endeavor to make ends meet is to reduce wages below a legitimate standard, below what is fair, equitable, humane or expedient, by all means let such portion of the industry leave us, and go elsewhere, we want none of it. Such condition is sufficient to warrant, to demand drastic action. There is no hope for them.

Gentlemen, on a previous occasion when addressing this Association, I stated very plainly that in my opinion, the supremacy of cotton manufacturing in New England was not in jeopardy, and if conducted on right lines, on broad, progressive principles, in conformity with the changed and ever-changing requirements of the times, it would be unassailable and further, that the financial strength and stability of our corporations with the resourcefulness, energy, experience and executive

ability of our mill men, were a guarantee of the strengthening of our position generally. Conducted in such a manner, there need be no misgiving as to the future.

One of the curious and inexplicable features of the situation is the almost complete absence in certain quarters of any clear indication from those who speak and act in the name of authority as to the direction in which the path of future progress lies, as to the direction from which relief is to come, the decisive part to be taken in shaping the course of the future: on too many sides uncertainty as to how to act or what to do under existing conditions is painfully and unfortunately apparent.

We cannot of course, resist the conclusion that certain branches of the cotton industry of New England, in the state of transition through which it is passing, are now face to face with a serious and difficult problem, calling for drastic action, reform, reorganization, both physical and financial, as well as managerial.

The problem, however, is not peculiar, but, in the method of its solution will come the supreme test, more severe, perhaps, than any which the mills and the mill men have ever yet been put to. Will they prove and are they proving equal to it? New England will indeed be poorer and the outlook gloomy if they fail. Those of us who believe that they will not fail feel that anything which helps to a clearer and better understanding of existing conditions must needs act as a strengthening and bracing influence in the work before us.

What has to be done, what must be done, is to put the entire cotton manufacturing industry of New England in a position to hold its own against all comers in the great struggle for trade by leaving nothing undone towards furthering and promoting the development and the prosperity of the industry. The difficulties to be met should be no more than enough to awaken salutary exertions so that we may maintain our lead and compel in the future as in the past that in cotton manufacturing we have no rival, maintaining our place of eminence, overcoming all obstacles.

As already stated, I am not one of those who imagine that the cotton industry of New England is doomed, is on the verge of collapse, or has reached the zenith of its prosperity; panic theories of that character are untenable. True sympathy for prevailing ills does not express itself in morbid pessimism, but in pointing out the road to improvement and in inspiring hope and courage. Of one thing the whole country from Canada to the Gulf and from the Atlantic to the Pacific may rest perfectly well assured, and that is, that the cotton industry guided by New England hands and minds will not leave New England; on the contrary it will grow and increase on safe and sound lines, always advancing and progressing in the direction of finer and more varied fabrics, and will continue to be one of the chief sources of wealth, employment and prosperity of this section of this great country. There is probably nothing of so great interest and importance to the people of New England as the future development of the cotton industry.

Personally, I have the strongest possible confidence in the future of the cotton manufacturing industry of New England, destined as it surely is to play a still more important role in the future progress, development and prosperity, not alone of New England, but of the entire country.

Gentlemen, the situation which New England holds among her sister states of the Union forbids an exclusive selfishness.

The interest of New England is not an interest which stands isolated and alone. The prosperity of New England, rich with the spirit of progress and invention must contribute to the prosperity of the entire country. Actuated then by broad principles and generous feeelings, let us trust that the cotton trade of this country, both capital and labor, regardless of location, may all alike receive an ample share of industrial peace and prosperity, giving to trade, now reviving, greater extension and increased employment, after the protracted and trying times through which we have lately passed.

Daniel A. Tompkins, of Charlotte, N. C., followed with an interesting address on the storing and marketing of cotton. He began by referring to the frequent predictions of the decline of the New England cotton industry and combated the idea, summing up his conclusion in these words:

I concur fully with what our president has said in respect to the continuance of the cotton business in New England and its continued prosperity. There is no ground on which any of us can justly believe that the cotton spinning business and the cotton weaving business is going to locate itself on any one spot in the world. We find that Switzerland is continuing to buy cotton at 25 cents a pound and to make embroideries and muslins which it sells at $40 a pound, and we do not hear anything of Switzerland's quitting the business. She is not selling cotton; she buys cotton, makes it the basis upon which she can put knowledge and skill and sells knowledge at a higher price than any fabrics which we have yet made in this country, so far as my knowledge is concerned. Is New England going to become a quitter, when Switzerland says nothing about quitting and does not intend to quit? I do not believe it. I believe you are going ahead and that Switzerland is in greater danger of having her cotton trade taken by New England. than New England is of having hers taken by the South.

The speaker then took up the main subject of his address, which was in part as follows:

Cotton is unlike any of the other staple crops in that the whole American cotton crop may be the victim of one frost, and it is such a proportion of the world's crop as to make it a controlling element. We make in one year 144 pounds of lint cotton to the acre, and in the next year 232 pounds to the acre. In respect to this consumption of cotton we are like the savage of old time who, when he went out and accidentally killed a wild beast, proceeded to gorge himself and left the great bulk of the carcass to rot, taking no pains whatever to take care of the surplus and to have it properly distributed through three meals a day, but having a feast for two hours and then a famine for a month, and sometimes starvation.

We handle the cotton crop, which is just as uncertain as the savage's food was, in very much the same way that the savage handled his food product.

We have made 232 pounds to the acre, which would give us with this year's acreage a crop of something like 15,000,000 bales. We gorge the markets, we lower the prices, we destroy the plane of prices upon which we worked the preceding year and move it downward, and when the next year comes we have no cotton with which to run the mills for two or three months. We have made the world accustomed to low prices—to a large surplus which has been forced into consumption at very low prices; and it is impossible, in a very short time, to get the people of the world back to a state of mind where they will give the higher prices, or, approximately, to a domestic condition where they need goods at better prices, in view of the purchases they made the year before.

This year we have planted about 32,000,000 acres of cotton according to the Department of Agriculture. It is possible yet that because of bad weather and frost we may make 150 pounds of lint cotton to the acre, and equally possible that we may make 200 pounds to the acre. The maximum in the last few years has been about 232. I do not think the crop is now in a state to make 232 pounds, but 200 pounds is an easy possibility, and 150 pounds is an easy possibility with bad weather and early frost in the interim.

In many other departments of life we have found means to get an approximate average of consumption and supply. We have learned to store the wheat and carry it until it is needed. Life insurance companies have devised plans by which they can determine the average life of 2,000 individuals, and for a premium they will guarantee the life of any one individual man. Now if cotton was raised over a sufficient territory and so large a proportion of the cotton was not subject to the vicissitudes of one single frost and to other risks, such as very wet weather, very dry weather, the ravages of insects, some kinds of which frequently survive for a term of years and then pass away, but materially affect the crop while they live,—if we could have the cotton crop raised over a sufficient portion of the earth's surface like wheat, which. when it fails in the Northwest, may be a good crop in the Argentine or in Russia, then we would not be subject to the extreme fluctuations which we now suffer in consequence of the fact that the crop is confined to one area and subject to the weather of that one area.

If you could possibly devise to distribute the cotton over ten years, the average price and the average quantity would go far to satisfy the producer, the consumer and the manufacturer. We would have an infinitely better situation than we now have. If the average of price and quantity for a period of years could be maintained the difficulties that your president spoke about in respect to labor and its being dissatisfied at one period and very properly dissatisfied, its having an excess of opportunity for employment at another period, then there would be no need to have these fluctuations in the demand for labor required to manufacture cotton. The world would be accustomed to the moderate variations which would be the result of carrying the surplus from one year to another.

There can be no doubt in the world but that the first step in the direction of accomplishing this average is to fix a place to keep the cotton in safety. The savage cannot leave his carcass in the woods and take care of it; the beasts come along and eat up what is left or it rots. We cannot leave the cotton in the back yards of farmers' houses or on the open platforms at the railway stations of the South, unprotected from the weather, from thieves and other vicissitudes. It looks as if a bale of cotton would be an unhandy thing to steal, but we have some experts down our way who do it now and then. We must have it protected from fire, and have it in such shape that it can be made to serve as a collateral, so that a large margin of the money value may be obtained from banks and put to work at once.

It seems more than astonishing that with a crop upon which the interest of so much of the world depends, both in respect to the consumer's interest for clothing, the inventors' interest, which is a large one here in New England, and the interest of the working man, that the raw material should never have been taken and housed and insured and made to serve as a bank collateral. It is for that reason that it is necessary at the present time for cotton to be forced upon the market. Under present conditions, if there were made 15,000,000 bales of cotton in the South, it would be necessary to force it upon the market, and that often at a time when the banks of New York and Boston are full of money and hunting investment at a profitable rate of interest, but which cannot be used to carry a surplus with a collateral that is better than any other collateral in the world. Cotton properly cared for is less liable to damage in warehouses—in fact it is less liable to damage outside of warehouses than wheat is inside of warehouses. You all know that wheat is a first rate collateral. It is an astonishing thing that cattle that are loose on the plains, though it looks as if they could not be gathered in at all, are better collateral than cotton, simply because there is an organized system of cowboys and of handling those cattle, by which the bank can get them if it wishes and it knows they will be there.

Now, as I have said, the first step in the direction of accomplishing this average in a number of years is to provide a means for housing cotton. It should not be left in the open air on a platform, nor should the mills be required to buy and move it immediately for expensive housing in large cities. In order to do this it would seem that the most important thing is to form a company or system of companies which should build large central warehouses in the cotton producing area and issue certificates upon the cotton which should be stored in them.

I do not mean the cotton mill warehouse. There have been efforts made before to organize and operate storage and loan companies, but they have attempted to issue warehouse receipts upon cotton which was in a mill warehouse, and that of necessity had to go into consumption to keep the mill going. That is not the cotton that I am discussing provision for. It is the cotton that is in excess of the immediate present demand; the cotton that is not going into consumption.

When cotton is put in a cotton mill warehouse and a certificate is issued upon it, either one of two things is true: the cotton is tied up so that the mill cannot use it, or else the so-called certificate no longer represents the cotton. Permits by the banks have been given to the mills to take

the cotton out and use it as they needed while the banks held the certificates. What does the certificate represent in a situation like this? Absolutely nothing. You cannot issue certificates for investment of idle capital on cotton which is in process of being consumed, and the cotton that is in a cotton mill warehouse is in process of being consumed.

It might be possible, of course, for a mill to divide up its warehouse and put a lot of the cotton in a certain part of the warehouse to be made subject to investment certificates for six months; but it is not possible to have cotton in a warehouse subject to being taken out and used currently and a certificate outstanding upon it which should be considered safe. That is the reason the investors have not in the past bought certificates on cotton in mill warehouses and that is the reason the efforts to make use of cotton as collateral for money in distant points have been more or less unsuccessful. There was too much license given to take the cotton away and to manufacture it, and when the debt became due the certificate did not represent any security at all because the cotton was gone.

The present wide fluctuation of prices makes gambling. I have no doubt—I certainly have felt—that within the last year I had ceased to be a cotton mill operator in the legitimate sense of the word and was compelled to go into a speculative market and gamble in cotton whether I wanted to or not. To buy was doubtful; it was not upon a legitimate business basis. Not to buy was doubtful and my operations were not on a legitimate business basis. Simply trying to do the thing that was for the best interest of the mill in either direction and that thing was a gamble.

Now the average saving and distribution of the surplus of cotton means the elimination of the gambling proposition for the producer as well as for the manufacturer, and for the laborer as well as for the consumer, and it is tremendously to the advantage of all.

The first pre-requisite to the accomplishment of that is to build central warehouses near where the cotton is produced, where the farmer himself may go and store his cotton and if he is disposed to hold his cotton to see whether it goes up or down —he can be given a certificate—provided the warehouse is large enough to justify management and the clerical organization to take care of it; provided it is large enough to justify the putting in of the cotton; large enough to justify its protection by a system of sprinklers and other fire protection; provided it is in the hands of a corporation whose certificates are known to be absolutely good for the cotton, but that when the certificate is delivered at that warehouse the cotton will be there. That has been done with wheat. That system of saving the surplus and distributing it properly has been brought about in almost all food products. It has been necessary to bring it about, and it can be brought about, in my opinion, in the matter of cotton.

Mr. Tompkins spoke without notes and showed plainly that his views on the growing and marketing of cotton were based on observation and study of the conditions in the cotton fields and markets. While the warehouse idea and the arguments he advanced are not new, the support of the project by one as well informed on the subject as Mr. Tompkins, is significant and likely to have considerable influence toward making a trial of the warehouse plan under favorable conditions. Mr. Tompkins also referred to the growing scarcity of labor in the South, stating that of the 800,000 immigrants who came into the United States last year only 25,000 went to the South, where the demand for labor is so strong. While recognizing the sound reasons that prompt foreign nations to promote the raising of cotton in their own possessions, the speaker expressed the belief that they would fail to increase the production of cotton in time to relieve the scarcity of which last year gave warning. He pointed out the ease with which new comers could become cotton raisers and urged the New England Cotton Manufacturers' Association to take energetic measures to direct the stream of immigrants to the South, where they could find steady employment and wide opportunities to become independent cotton planters.

This is in line with the views expressed in this journal. The European nations might better direct their energies to increasing the labor supply in the cotton fields of the South which are so highly favored by nature, rather than waste human life, energy, money and time in efforts to raise cotton in hot, fever-laden climates, under adverse natural conditions.

After this discussion the following paper was read:

The Economic Extension of Cotton Cultivation in the South.

HENRY G. KITTREDGE, Boston, Mass.

The extending use to which cotton is being put, by itself and in combination with other fibres, for fabrication and other purposes, because of its comparative cheapness and utility, makes its supply a question of grave import throughout the civilized world. Cotton estimated by what it can be used for, is no longer cotton alone, but wool, silk, flax and nearly every other fibre that is capable of being spun and fabricated. That is, there is scarcely a fibre for which it cannot be substituted without serious prejudice to the article into which it is introduced. Within the last quarter of a century it has almost completely turned the hosiery and knit-

goods industry from wool to itself, and, mercerized, it has entered the domain of silk. In every instance it has asserted an intrinsic value from which it has no occasion to shrink.

There is much reason to suppose that cotton will enter more into the economies of man as time goes on, than has ever been witnesed in the past, even in greater proportion than any increase in population. With the world's population at 1,600,000,000 nearly two-thirds of it, or 1,000,000,000 people, is insufficiently supplied with cotton fabrics, approximate to a civilized standard of need; and even the remaining third, or the civilized portion, is not altogether consistent in its consumption. The opportunity, therefore, for extending the consumption of cotton in some manufactured form is immense, and that it is being taken advantage of, more and more, is too evident to acquire any elucidation from me.

The total consumption of cotton in the world, and, therefore, its production, as near as I can estimate it, is 15,700,000 bales, of 500 pounds each, and 1,300,000 bales of this quantity are spun and woven on the hand implements of uncivilized people, or otherwise employed by them. This leaves 14,400,000 bales of cotton to be spun by power machinery for commercial use; and this is reckoned as the consumption of the world in commercial statistics. Again, I estimate that 10,200,000 of these bales go to meet the requirements of the civilized people of the world (600,000,000), and 4,200,000 bales to supplement the wants of the uncivilized or semi-civilized people, as those chiefly inhabiting the continents of Asia and Africa.

The per capita consumption of the one thousand million uncivilized people I estimate at 2 3/4 pounds of unmanufactured cotton,—3 1/4 pounds for those of Asia and 2 1/4 pounds for those of Africa and Polynesia and elsewhere, or an aggregate of 5,500,000 bales (1,300,000 and 4,200,000). The per capita consumption of the 600,000,000 civilized people I put at 8 1/2 pounds, or in the aggregate 10,200,000 bales. This per capita estimate, of course, includes the 25 pounds per capita consumption of the people of the United States, which accounts for 4,000,000 bales of the amount. The people of Great Britain consume only about eight pounds of cotton per capita, and those of Europe much less, but how much less there are no available means of ascertaining.

In these figures may be seen the vast possibilities of increasing the consumption and needed production of cotton, which will inevitably follow the extension of civilization among all people of the earth, with an accompanying increase in prosperity and wants. As it is, the industrial use and consumption of cotton have been greatly augmented during the present generation, and in much larger proportion than the growth of population. The world's consumption within the last twenty years has nearly doubled, or has increased from 7,450,000 to 14,400,000 bales of 500 pounds each; and nearly 5,500,000 bales of this increase have been the production of the United States. Should this demand continue for the next twenty years, it would need a supply of nearly 22,000,000 bales at the end of the period, and in all probability much more than this, considering the constantly new uses to which the fibre can be put at a comparatively low cost. The price of the staple has been and is destined to be more of a factor in determining and regulating its production and consumption. Should it become a satisfactorily profitable product to the planter at six to eight cents a pound, there is no telling how far the demand and cultivation will be carried. From present indications, according to the views of some, whose competency to judge is indisputable, the cost and difficulties attending the harvesting will soon be reduced by the employment of some pneumatic picking mechanism that may be evolved out of certain devices that are now in an experimental state of existence.

The consumption of cotton of late years has been limited by its supply, which is inadequate to meet the demand, within one million or more bales. There is, today, a commercial demand for the manufactured products of fifteen and a half million bales of cotton, and if prognostications are of any value, twenty years hence will see a legitimate call for fully twenty-five million bales to satisfy the normal wants of mankind. Whence is this needed supply to come? It is a question of dominating importance to the manufacturing industries of the world, and its realization is being discussed with considerable solicitude by the spinners of Great Britain and the continent, and new fields of production are being exploited. It has been confidently asserted that our own southern states are equal to the occasion, and any exigency that may arise in this particular can readily be met by the planters of the south.

That the south is capable of raising all the additional cotton that may be wanted for the next quarter of a century, at least, may be conceded at once; but southern industry and prosperity must meet this question from an economic standpoint, and discuss it as a business proposition, involving trade, commerce, and manufacture, as well as agriculture, in such aspects as should be naturally associated with the material progress of that section of our country.

No country or section of a country can afford to neglect the utilizing of its natural resources, if they can be turned to profitable account; and, of all regions, the south has other resources of wealth than those dependent on agriculture. Its geographical position in the commerce of the world, especially in its prospective relation with the countries contiguous to the Pacific Ocean, upon the completion of the Panama canal, is an advantage which it possesses, awaiting an immense development that must and will engage the thoughts and activities of a large population interested in the means of transportation, trade and manufacture, besides in those of agriculture.

Within the next twenty years, it may be safe to say that there will be a demand for seven to ten million more bales of cotton for the commercial requirements of the world. Admitting this as a probability, the question is, should the spinners of the world rest contentedly upon any presumption that this increased want will be supplied by the south? or should the south undertake, as an economic proposition, to furnish this additional supply? And if not, will not the south have reached an economic extension of cotton cultivation when it attains an average annual yield of fifteen to seventeen million bales upon an area approximating 35,000,000 acres? It is upon these last two questions that the observations and discussions in this paper revolve.

The cotton area of the south may be defined as

coming within the limits of North and South Caroline, Georgia, Alabama, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, the Indian Territory, and Texas, east of the one-hundredth meridian. Though cotton is raised in southern Virginia, and in other states in the same latitude, the cotton region of the south is properly confined to that south of the northern latitude of North Carolina. This cotton area, proper, contains about 400,000,000 acres of land, of all description, good, bad, and indifferent, arable and inarable, everglades and barren plains and hill tops, in fact everything, not covered by water, including the vast tracts of forests. The forest-lands, or those which are capable of furnishing 75 cords or more of wood, cover fully 60,000,000 acres of this area; and the preservation of this domain of forests is of vital importance, not only to the lumber interests of the south, but to its industrial enterprises of every kind, especially in the conservation of its streams and water powers for manufacturing purposes.

Deducting the land unavailable, as already noted, and such as is occupied by cities and other settlements, or unfitted for the profitable cultivation of cotton, the cotton area of the southern states may not exceed 300,000,000 acres, if it is not very much less than this when carefully considered in connection with the natural conditions of the soil, and in the light of recent researches affecting the austroriparian crop zone of the south.

The reason for placing the hundredth meridian as the western boundary of the cotton zone is that beyond that, is the rainless or arid region—the llano estacado and gypsum districts—of Texas.

A study of the figures of the twelfth census of the United States, relating to the production of cotton, shows that practically the entire yield was within the austroriparian area. This census year was no exception to what annually occurs. This limitation in the cultivation of cotton is further observed in the cotton ginning reports of the Bureau of the Census. Facts, therefore, corroborate scientific research, to the effect that the cultivation of cotton is pretty well confined to its natural domain, which does not embrace the entire south, and that this region has considerable territory unfit for the successful culture of this staple. Considering what has been stated regarding the natural, and, as has been observed, and shown by the map, the actual productive area of cotton in this country, I think you will agree with me that 300,000,000 acres, as previously noted, are an excess, rather than otherwise, as representing the available cotton lands of the south.

Having defined the cotton producing area of the southern states—the austroriparian or humid division of the lower austral zone, that within the climatic influence of the gulf stream, extending northward through the valley of the Mississippi river to Cairo, and on either side of it,—let me say something about its cotton producing soils. It is a well known fact that even within this area there are soils too poor for the profitable growth of cotton. The back bone of the cotton area, so far as soil is concerned, is the Mississippi river valley and alluvial plains, from the Gulf to the northern limits of Tennessee. The soil formation west of the Mississippi to the central part of Texas is not unlike that east of that river, only in inverse order, that is, the order radiates from that river, one going west and the other east, the latter terminating roughly at the Chattahoochee and the former at the Nueces River. It is within these limits that the future cultivation of cotton will be mainly conducted, as is the case today, that is on the calcareous soils that are so widely prevalent throughout this section, and which are so highly favorable to any intensity of cotton production.

The maximum yield of cotton on natural soil might be expected on the botton plains and upland swamps along the Mississippi and Red rivers, on the highly calcareous and otherwise extremely rich "buckshot" soils, that extend to the southern limits of Arkansas. Only of little less fertility are the bottom or low lands between the Mississippi and the Yazoo, and next to these the uplands or table lands bordering the Mississippi bluff. The chief cotton producing lands of Texas are the tertiary and cretaceous prairies extending diagonally through the central part of the state from the Red River to beyond San Antonio, covering an approximate area of 16,600,000 acres consisting very largely of a black, waxy soil, or "adobe." But nearly all of the eastern half of the state, or 80,000,000 acres, may be classed as a good cotton region, embracing not only the rolling black waxy prairie lands, but black sandy prairie lands underlaid by a heavy clay subsoil.

The soil from the Chattahoochee river northeast to into Virginia is mainly of a silicious character, and but few calcareous areas are met with, and naturally is much less fevorable to cotton cultivation than the soil to the westward, as already alluded to. This natural disadvantage, however, is very materially offset by a rational and systematic culture of the plant, that enables many farmers to procure more than an average yield per acre. The use of fertilizers has done much for Georgia and the two Carolinas in placing these states even where they are in the production of cotton. But these artificial methods of increasing the fertility of the soil add to the cost of culture, though economical, it may be, under prevailing conditions at the places where practiced. The same system for maintaining the productiveness of the soil west of the Chattahoochee must in time become a necessity.

Though Tennessee is reckoned in with the cotton states of the south, only that portion of the state lying west of the Tennessee river can be considered as especially adapted to the culture of cotton Nearly two-thirds, or about 18,000,000 acres of the state should, properly, be classed out of the cotton area of the south, not because this staple cannot be grown there, but because the soil and climate are better adapted for something else, as tobacco, grain and grasses.

There is a large part of the state of Arkansas that is unsuitable for the profitable cultivation of cotton, lying in the north and northwest, enough to warrant a deduction of 15,000,000 acres from the area for this purpose.

The Indian Territory and Oklahoma have recently come into prominence as contributing to the cotton crop of the south, but there are many exaggerated ideas about what they can do toward the culture of the staple, in quantity, or quality. They have rich, tillable lands, every way adapted to successful cotton culture but they have, also, large areas wholly unfit for this purpose, especially those found in the western section that forms part of the great

arid, gypsum plains. I should say that 20,000,000 acres could easily be deducted from the total area of this territory as unfit for the culture of cotton.

There are instances of a production of more than a bale or even two bales of cotton per acre, but they are exceptional, and due to a superior system of cultivation intelligently carried out under favorable climatic conditions. They cannot be cited as what can be done throughout the south, or even for any considerable portion of it.

Seldom indeed, does the yield come up to the natural productivity of fresh land, more generally it does not come nearer than 60 to 75 per cent. of it. There are various obstacles to the attainment of any larger percentage than this, the principal one being the weather, but of scarcely less import are the intelligent or improper methods of culture, which seems to be an innate failing among a farming population and which must be reckoned upon, regardless of any possible improvement through the educational efforts of the national and state departments of agriculture.

The soils of greatest natural productivity are the alluvial lands and upland swamps of the Mississippi River Valley, but for these in their virgin fertility it is not claimed that an average yield of over 400 to 600 pounds of lint can be expected, even under most propitious circumstances. Next to the alluvial and swamp lands, may be mentioned the brown loam bluffs and tablelands of Mississippi, and the black, stiff calcareous soils of central Texas, for which, however, an average yield of 300 pounds to the acre would be regarded as excessive. And thus it goes, down to the 100 or 200 pounds yield of lint per acre as an extreme limit of production belonging to the sand and red hill regions or belts of North and South Carolina. These maximum yields may be reached under propitious conditions of climate and culture, and exceeded in individual instances, but at the very best they can never be calculated upon for any considerable area, even in the regions where they are possible.

Taking the cotton growing area of the South as a whole, and it is extremely improbable that an average annual yield exceeding 250 pounds of lint to the acre will be reached; but should it at any time, it would be so exceptional as to have little effect upon the average for a series of a years. Thus far, the highest average yield was 232 pounds for the crop of 1898-99 (Latham, Alexander & Co's figures). The yearly average for the five years ending 1902-03 was 206 pounds, and for the ten years ending the same year it was 203 pounds. There seems to be no good reason for expecting a larger yield than these averages, for any series of years, yield than these averages, for any series of years, and, such being the case, all calculations on the South should be based upon these.

The judicious employment of fertilizers and a proper system of agriculture, effectively conducted, will always have a potent tendency toward increasing the production of the soil, but the most vital factor in determining the size of the crop is the weather, which the Almighty alone can regulate. This latter element effecting the yield, has no lack of examples, and those applicable to the crops of 1898 and 1903 are good ones in points. The average yield per acre in 1898 was 219 pounds, according to the Bureau of the Census (232 pounds as above, according to Latham, Alexander & Co., and the New York Cotton Exchange), and 168 pounds in 1903, a difference of 51 pounds to the acre. This difference was undoubtedly due to the almost perfect weather conditions during the growing and harvesting periods that prevailed in 1908, and the adverse weather conditions that prevailed in 1903. This discrepancy, small as it may seem for one acre, is enough to make a difference in a crop from 35,000,000 acres, of 3,500,000 bales of 500 pounds each.

This number of acres, 35,000,000, devoted to the culture of cotton, I regard as prophetic of the limitation of the amount of land that the South can economically give to this one agricultural product. It would not, as I view the industrial and commercial welfare of the South, contribute to the prosperity of that section of our country, to devote a larger proportion of cotton area to its husbandry, to the neglect of other agricultural pursuits, many of which are identified with the comfort and material well-being not only of the farming, but of the entire, population. To do so would be like a man putting his eggs all into one basket. It would concentrate capital and productive energy too strictly into one occupation, which is contrary to all good rules of economics, as every one knows. This number of acres would be that of giving one acre in every eight or eight and a half, on the average, of the available cotton area, to this single crop, which would exert such a predominating influence over the affairs of the people that should they meet with a period of depression in trade, the effect would be calamitous from which recovery would be slow. One acre in every eight leaves none too much for diversified agriculture or for a rotation of crops, as good farming requires. Every cotton planter should produce, at least, what is consumed on the premises by his live stock, so far as the soil and the climate will allow him. His hay and grain, vegetables, fruits, dairy produce, etc., should be of his own raising, and this done he would not have a great amount of land left for cotton, even assuming that this was the only farm produce that he cared to market.

There are unquestionably some parts of the South where good farming might permit the devotion of, perhaps, one acre in every four, to cotton, as is now practiced, but these highly favorable sections are more than offset by those whose soils are poor and unprolific. If there is a region that can stand a cotton cultivation of one acre in every four, it is that embracing the alluvial lands of the Mississippi River valley; and there are spots through the black prairie region extending from northeastern Mississippi south-eastwardly through central Alabama, that can support, as they have done in the past, an intense cultivation of this kind. But these places are an exception and it is a serious question whether this extreme devotion to one crop is advantageous or conducive to the best welfare of the farming community even in these localities.

If 35,000,000 acres mark the limit of the area of economic cotton cultivation in the South, then the limit of cotton production may be placed at 15,000,000 bales,—203 pounds of lint per acre and 480 pounds, net, per bale,—or perhaps, 17,000,000 bales under the most favorable conditions from the sowing of the seed to the end of the harvesting season. If any season should prove as unproductive as the

one just ended, the yield would be no more than 12,500,000 bales; and any low yield like this would create a panic in the cotton supply of the world, ten years hence, as keen as that which has been experienced of late unless there should be an increased production elsewhere in the world. This low yield is as likely to occur in the future as it has in years past, and for this reason it is incumbent upon the cotton spinners of the world to encourage cotton cultivation in other parts of the globe to meet any possible, if not probable, deficiency in the American supply in the next ten or twenty years. It will take all of this time to bring about the necessary labor conditions and methods of cultivation and adapt them to commercial requirements, before new and untried realms of cotton culture can be transferred from the tentative period to one of fruition. Whatever the efforts may be and however well devised, they will be costly and uncertain and in many instances result in failure. Still they are more or less imperative and their initiation should not be delayed.

I do not think the southern planters need have misgivings of any extension in cotton culture in foreign fields militating against their interests any more than in the past or is being felt today. Their cotton is likely to receive the preference, so far as there is any present evidence, over anything that can be raised elsewhere in considerable quantity. And for the South, its industrial and commercial activities would be circumscribed and jeopardized to having its energies and ambitions applied toward the attempt of raising cotton to meet the world's prospective demand in the hope and expectation of being able to control the price of the staple. Any course of this kind would defeat its purpose. Any unduly high price for a commodity is as detrimental in the long run, to the interest of the producer as to that of the consumer.

The South has other things than cotton at stake, that are of vital importance to its agricultural, manufacturing and commercial life, and which should not and cannot be economically disregarded.

The next paper was entitled:

The Business Side of Cotton Manufacturing.

JAMES R. MACCOLL, Pawtucket, R. I.

In the midst of discussion of the machinery and methods employed in the various proceses of cotton manufacturing, it is well occasionally to recall that there is also a business side which is of equal importance. A mill may be well equipped and organized and able to produce nice goods, and yet fail to make money because of some weakness in the business management. Talking some time ago with a prominent and successful New York merchant, who is largely interested in mills, regarding a suitable man to manage a mill, he said, "I do not care anything about a practical man; what I want is a good business man." This is an extreme view, but it emphasizes a side which is often forgotten. The ideal manufacturer should be both practical and commercial.

In the following brief paper I propose to point out some of the rocks on which cotton mills have foundered, and to avoid which there is required, not so much a profound practical knowledge of the processes of cotton manufacturing, as clear-headed business judgment and executive ability.

Capitalization. Existing conditions are varied. Some concerns are started with a small capital and a debt on the plant, the optimistic view being taken that a few years of good trade will put them in easy financial shape and large returns may then be expected on the investment. If these anticipations are not fulfilled, the raising of additional capital, or a reorganization follows. Other mills have capital enough to discount bills and seldom require to borrow money. It is safe to say that no mill should have a debt on its plant. In prosperous times, when profits are good, financial institutions are chary about lending money to such concerns, and when there is a stringency in the money market or when manufacturing conditions are difficult, in order to get money, excessive rates of interest have to be paid, and the treasurer has to spend many anxious hours in hunting for funds, which might be better used in the following up the other departments of the business. Banking institutions do not regard buildings and machinery as a valuable asset. If the quick assets fail to reimburse them for their loans, they do not want to take over the plant, with the possibility of having to put in more money to make the mill efficient, and with the risk of a much larger loss, through mismanagement or business reverses.

Closely allied to capitalization are questions relating to depreciation, construction accounts, and dividends.

Many mills ignore depreciation or have no fixed percentage charged off to this account. It goes without saying that until an adequate amount has been allowed for depreciation, so-called earnings cannot be considered as net profit. From two to three per cent. on buildings and from five to six per cent. on machinery is generally considered adequate, if in addition, a sufficient amount is regularly spent on repairs. It is always a short-sighted policy to allow repairs to lag and the plant to get into a run-down condition.

Construction Accounts, whether known by the name of machinery, improvement, special repairs, or otherwise, are conveniently used to relieve expense account, thereby increasing profits fictitiously. In all well-managed concerns there should be a careful auditing of every item charged to so-called construction accounts, in order to prevent the cost of the plant being added to without a corresponding increase in its size or capacity.

Auditing has undoubtedly been very much neglected in our American corporations. The result is that directors have occasionally rude awakenings, when they discover that they have been lulled to sleep by plausible accounts or statements. Every executive officer should welcome a thorough auditing of his work and every board of directors should not rest satisfied without it. There is a yet undeveloped field for men combining practical knowledge of cotton manufacturing and keen business and financial ability, as auditors and examiners, not only of ledgers and cash-books, but also of inventories and plants. To know the exact condition, and to look it squarely in the face, is always wiser and safer than the ostrich policy.

And conservatism with regard to dividends is worth mentioning as a part of good business man-

agement. In prosperous times, it is prudent to prepare for adversity, to strengthen resources, and to remember that changes in fashion or in the conditions of the market may call some day for unusual expenditures for new machinery. Dividends once paid cannot be recalled. We all know of mills that in years gone by have been large dividend payers, and later have had to call for new capital in order to bring their plants up to an efficient standard. A six per cent. dividend looks very satisfactory to stockholders until they have become accustomed to eight and ten per cent. It is better, however, to reduce dividends than to weaken resources.

In ascertaining profits, the inventory usually requires the closest scrutiny. It "covers a multitude of sins" and of self-deceptions. The quantities must be carefully verified and the valuations must be safe and conservative. It is equally easy to minimize and magnify profits without any actual dishonesty. A generous use of pessimism or optimism will accomplish the purpose desired.

Many mills have been unsuccessful because poor judgment was shown in their location. An ideal location should be convenient of access to the principal markets for the product, favorably situated for low freight rates on supplies of fuel and cotton, have ample water for condensing purposes, and an adequate supply of help of the right kind for the work to be done. If these favorable conditions are lacking, immunity from taxation is too temporary a bait to be considered.

Mill Tenements are an undesirable investment, but their effect on wages and on control of the help should be carefully weighed. In some cases, a large expenditure for factory houses has been proven to be wise and far-sighted.

The Buying of Cotton at the right time and price is important. During recent years, this subject has given much thought and anxiety to the cotton manufacturer. The result of the year's business in profit or loss has frequently depended on the price paid for the raw staple. If the buying of futures were confined to the quantities legitimately required for consumption by the manufacturer, the system would be highly beneficial, but when speculators can buy and sell a whole crop in a few days and keep up this process throughout the year, the price of cotton is liable to be juggled out of all harmony with actual conditions or with the goods market, which is governed by the law of supply and demand. During the last five years the highest price of middling uplands has averaged nearly 60 per cent. more than the lowest price. The figures are as follows:

	Highest.	Lowest.
1903-04	17 25/100	9 56/100
1902-03	13 50/100	8 30/100
1901-02	9 7/8	7 13/16
1900-01	12	8
1899-00	10 1/4	6 1/4

These wide fluctuations show the difficulty of the problem of buying cotton wisely. Where is the man who always hits it right?

Do not try or expect to buy all your cotton at the bottom. It is safer and more likely to result well to buy at a price that in your opinion is reasonably low and to have confidence in your own judgment when that point is reached. It is generally disastrous to be blindly carried away with extreme views. In spite of unanswerable statistics and arguments for higher prices, cotton may go down, and vice versa. There are many unforeseen contingencies that may arise in a night. As a general rule, it is more disastrous to buy at too high a price than to fail to buy at a low price, because if cotton advances, in normal conditions of the market, goods will advance in proportion; but if cotton declines after you have bought, the market for goods is apt to decline also, leaving you to take a loss on your high-priced cotton. During the last year, this condition has not occurred owing to speculation forcing up the price of cotton in the face of depression and over-supply, which tended to push goods down.

Before leaving this subject of cotton buying, let me suggest that there are many mills running in poor shape because of false economy in buying too poor a cotton for the work to be done. A trifle saved in the price of cotton will soon disappear in increased waste and lessened production all through the mill. Some manufacturers are afflicted with the incurable disease of buying poor cotton on the "Penny wise and pound foolish" principle. On the other hand, skilful manufacturing requires that the cotton shall not be of better grade and staple than the work requires.

What to make, and how to sell the product are important business problems. Mistakes are often made by steering the mill in the wrong direction, wasting time and money in equipping the plant to make goods that are ill-adapted to it, or lacking in permanency of demand. Changes onto new fabrics should be carefully considered as to their effect on production in the various processes and on the general expense account. The wise manufacturer is careful to experiment before plunging into large contracts or untried work.

Equally important is the question of how to sell the product. A poor selling agent has often ruined a good manufacturer. Enthusiastic as to future sales, he has frequently counselled the piling up of goods which had later to be slaughtered at ruinous prices. The commission-house system has prevailed to a large extent in this country. By advances on goods and other financial assistance, it has enabled manufacturers to extend their business beyond the capacity of their capital, and as a result it has generally encroached on the province of the manufacturer by controlling the policy and the output of the mill and fixing the prices. Sometimes this has been attended with successful results, but in many cases with disaster to the mill. Many evils have crept into the merchandizing of goods through the power of the commission houses, such as exorbitant dating, carrying goods on memorandum, protection of unsold stock. Had the manufacturer been strong enough to keep control of his business, these erroneous methods of selling goods might not exist to the same extent. If the commission houses were paid a percentage on profits instead of a commission on sales there would be less temptation to increase the volume of sales at the expense of profits, or to urge extravagant risks in making goods ahead of orders. There are, of course, many commission houses that have steered their mills with great wisdom and with large financial returns to the stockholders, but nevertheless an increasing number of concerns are

now selling their own product through their own salesmen, whose efforts are entirely devoted to the mill, and whose only object is to make a genuine success of the enterprise.

I believe that the manufacturer should dictate the policy of his business and control the prices at which the goods are sold,—of course, acting in harmony as much as possible with his selling representatives.

Much depends on the correct costing of goods. Millions of dollars have been lost by mistakes in this matter. If a mill is producing only one or two classes of yarns or fabrics, it is child's play to figure costs, but the greater the diversity, the more difficult becomes the problem. It is most important that expenses should be assigned as accurately as posible to each class of product, in order that all machinery may be run at the largest profit.. If one fabric, for example, does not bear its proper share of the expense, the cost will be figured too low, and as a result large orders may be taken which will, in the end, not yield the profit expected, while other fabrics may be overloaded with cost and orders lost on them, which would have been more profitable. Manufacturers sometimes hear prices quoted in the market which are incomprehensible. Either the competitor has made a mistake, or he is smarter than his neighbors and has learned how to make goods more cheaply. If the former is the case, it may take years to discover that the low-priced competitor has not been making money, that his mill is in financial straits, or that there is to be a change in management. The best test of correct cost figuring is when the annual balance sheet confirms the profit estimated on the production of various styles. Even then, expenses may be misplaced, but at all events, there is no disappointment or unexpected result. It is better to figure on a system that gives the actual costs in various departments than on a system which is theoretical and may be very different from the actual. It is also beneficial sometimes to verify costs by figuring on two different systems, the one checking the other. For example, if general expenses are figured on cloth production, as a check, general expenses might be divided between yarn and cloth production, putting the mill practically on the basis of two mills,—one producing yarns and the other cloth. In order to get at costs accurately, it is, of course necessary to have a thorough system of reports of productions and wastes, and it is a safe rule to say that if one report does not check another, the facts returned from the mill departments on these matters will generally be far from the truth.

Good business judgment is also needed in expenditure for new machinery. Our genial associate members in the machinery business are continually impressing upon their mill friends the wonderful increase in production, and economy in wages, in operating their latest devices, some of which are no doubt excellent, and many of which will only require time to decently bury them. The mill man should be able to estimate accurately the annual percentage on the investment that new machinery will earn. He cannot afford, however, to delay long in throwing out machinery that is doing poor work, and in adopting new machinery that will improve the quality of his output. On the other hand, there should be no large outlay for machinery that is in an experimental stage, and if the mill can only expend a certain sum on machinery, it should be put where it will yield the largest return in economy and quality, and be in line with other improvements to be carried out later. Many mills have expended much money on new machinery any yet never seem to get into shape to make satisfactory returns on capital. Others have shut their eyes to the march of improvement and find out too late that their plants are far behind the times and cannot compete with the better equipped concerns.

Another element of busines success lies in the selection and development of men. The latter requires faith and patience, and a penetrating judgment to foresee that the man has the necessary qualities which will eventually prove valuable, after making more or less mistakes. Just as good men are developed as are found ready-made.

I have thus endeavored to point out the importance of the business side of cotton manufacturing, and have touched upon the following subjects: capitalization, depreciation, construction accounts, dividends, inventory, auditing, tenements, cotton buying, what to make and how to sell it, costing, new machinery, selection and development of men. We have recently discussed on several occasions the best kind of training for young men desiring to be manufacturers. I would suggest that any system of training that is confined solely to the practical construction and operation of machinery, and ignores the business side, is likely to limit opportunity. The cultivating of business talent and of the executive ability to accomplish and do things is of vital importance.

To paraphrase a well-known passage: Though a manufacturer speak with the tongue of men and of angels, and understand all mysteries and have all knowledge, and have not the ability to do things, he is become as sounding brass or a tinkling cymbal.

On Wednesday evening a reception was given to the members and guests by President Walmsley, assisted by Miss Walmsley, Vice President Hartshorne, Miss Hartshorne, Vice President and Mrs. J. R. MacColl, Ex-President and Mrs. Walter E. Parker, and Ex-Presidents R. W. Eaton, D. M. Thompson and Charles H. Fish.

At the session which followed the reception, the first paper was entitled:

Hydrochlorite of Sodium in Bleaching.

CHARLES H. FISH, Dover, N. H.

The use of chlorine in the bleaching of textile fabrics is universal, its commercial form being the well-known bleaching powder, or hypochlorite, or chloride of lime. All who use bleaching powder in quantities must acknowledge its many drawbacks. It is not only disagreeable to handle, but being heavy, the cost of transportation is considerable. Also, if one utilizes its full strength, great care must be used in the construction of the apparatus, storage tanks, etc., and frequent repairs are necessary.

By passing a suitable current of electricity through a solution of common salt, the salt molecules are broken up, or separated into their component atoms of chlorine and sodium. To accomplish this, various forms of electric cells have been devised, nearly all of which work satisfactorily enough to a certain point. The chlorine can then be conducted away, and, in the bleaching powder of commerce, absorbed in slacked lime, while the sodium unites immediately with the water to form caustic soda solution, which is afterwards evaporated to the solid caustic soda of commerce, or as in the apparatus I am to describe the two elements can be allowed to come together forming hypochlorite of sodium, or what is commonly known as electro chlorine.

An interesting volume could be written upon the different apparatus, mostly commercially unsuccessful, which have been invented during the past few years.

The apparatus which is the subject in particular of this paper was designed years ago in Germany by Dr. Oettell, assisted by Messrs. Haas & Stahl, electrical experts. This gives promise of fulfilling our desires for an efficient and economical producer of hydrochlorite of sodium, and one which will compete in efficiency and economy with the usual bleaching powder solution.

This apparatus consists of an electric cell or electrolyzer formed in an odd shape from a secret composition, and placed within a water-tight tank, which tank is carefully insulated to prevent loss of electric current. The electrodes are moulded from a composition of carbon and are on the so-called double pole system, that is, with one pole at each end of the apparatus and a number of intermediate electrodes that have no contact with each other, or with the current, except through the solution. This electrolyzer is provided with a negative electrode at one end and a positive electrode at the other. These consist of thick carbon plates, standing vertically, extending completely to the bottom of the electrolyzer. All the rest of the electrodes are made up of carbon plates about 3/8 inch in thickness, fitting tightly across the apparatus in slides, thus subdividing it into numerous cells. These intermediate electrodes do not fill the entire space from top to bottom; they rest upon a non-conducting support and support a similar non-conducting plate that projects above the surface of the liquid. The latter arrangement is adopted for two reasons.

First. Each cell thus constituted forms a dead or non-conducting space into which dirt and impurities, carried by the liquor, are deposited, without causing short circuiting.

Second. The electrodes are covered with a head of liquor and the bubbles of chlorine gas given off at the electrodes, pass through this head of liquor and are absorbed by it, with the result that there is not the slightest odor of chlorine in the room where the apparatus works. These separate cells have no communication with each other, but each cell has a small external opening at the bottom communicating with the brine or solution in the tank, and one at the top also communicating with the brine in the tank. The tank itself is filled with brine until the brine is on a level with the opening at the top of each cell. The brine flowing through the openings fills each cell to the same level. When the current is turned on, a vigorous evolution of hydrogen gas ensues, which causes the liquor in each cell to be carried upward with the escaping gas, thus giving it a head of one-half to one inch over the brine in the tank outside the electrolyzer. The brine of course flows out from the cell through the opening into the tank and a corresponding amount is drawn in at the bottom of the cell to take its place. Thus there is a constant circulation caused by this evolution of gas. Some heat is evolved in the process, but this is controlled by coils of cold water.

The particular advantages as shown in this apparatus as against others which have been invented heretofore are as follows:

I. The initial cost is comparatively low.

II. By maintenance. The up-keep of the apparatus is very little; there being nothing to wear out except the electrodes, which are of carbon and inexpensive.

III. There are no moving parts; no pumps or arrangements requiring attention.

IV. Simplicity in operation. Once adjusted, no supervision is required and an ordinary boy can obtain good results.

V. There is no waste of chlorine and, therefore, there is absolutely no objectionable odor of vapors of any sort. The apparatus is perfectly clean and can be located at any point convenient to the work.

This, in itself, is a matter of great importance. The absence of vapors, so corrosive to brass, as well as iron, making it almost impossible to maintain sprinkler systems or piping of any sort, would be appreciated, not only by the manufacturer but by the insurance companies, who find in the sprinkling of the bleach house a constant bone of contention.

In enumerating the advantages claimed by the use of hypochlorite of sodium as against hypochlorite of lime for bleaching, I would say:

I. Intensely effective power of the nascent liquor and the great degree of permanence of whites obtained. It is well known that a gas in its nascent state is much more rapid and energetic in its action than one which has been stored. There seems no doubt but that 3 lbs. of electro chlorine will do the work of 4 lbs. of chlorine from bleaching powder. It has even been claimed that the porportion of one to two will be nearer the actual condition and that even in this proportion the whites obtained by the electro chemic will be purer and more permanent.

II. Universally greater strength and better appearance and feel of the bleached goods. It seems reasonable that if less amount of chlorine is used and when that is expended nothing but common salt is left in the gods, they will be in better condition than where the greater amount of chlorine is used with the accompanying solution of caustic lime.

III. Less acid is required after chemicing, while for many purposes only a slight washing is necessary as the small amount of salt in the fibre will not interfere with subsequent operations.

IV. It is of especial advantage in clearing the whites in printed goods. The whites are more easily cleared and the colors suffer less.

V. The process is much cleaner and vastly more satisfactory to deal with than the ordinary process with bleaching powder.

It can be readily understood that this process is not only applicable to the whitening of cotton in any form, but is especially adapted to the bleaching of flax, which being difficult to bleach, suffers more from the action of hypochlorite of lime than from the hypochlorite of sodium. It is also applicable to the fibres used in paper making: also to the bleaching of oil, artificial silk, viscose compounds, etc.

The question which would now naturally arise is why can we not recommend this process for immediate adoption in all bleacheries which are now using bleaching powder. In reply, I would say that the margin of 20 per cent. saving is based on figures as shown in the foregoing table and different locations with different conditions must figure for themselves the advantages or disadvantages to be derived. The price of bleaching powder is always an uncertain factor, being governed largely by an agreement among agents of the English, German and American makers. With the price of bleaching powder at 1.25 cents the margin of profit would be much more than with bleaching powder at 1 cent per pound. The cost for power is also to be carefully considered. Manufacturing plants owning their water power and their generating machinery could furnish power well within the figures given, while if the motive power is steam,, the cost would be considerably more, depending upon the efficiency of the steam plant.

It is understood, of course, that present electric incandescent light generators can be used during the day, or, in the case of the small plants the ordinary incandescent current can be obtained from the outside or city circuits, if within convenient distance.

It remains a fact, however, that for cleanliness and general efficiency the Haas & Stahl apparatus is in every way satisfactory, and from my own experience no one would make a mistake in adopting such an apparatus, although in certain locations and under certain conditions there might be little, if any, pecuniary benefit derived from its use.

We are now at work endeavoring to effect a greater production of chlorine in proportion to the salt consumed, and it is possible that the figures given in the table may within a short time be liable to amendment on the right side. With slightly more efficiency from the apparatus, the days of the bulky, ill smelling chloride of lime would be numbered.

The next paper was:

Theory Versus Practice in Bleaching and Mercerizing Cotton Piece Goods.

HENRY ROWE, Aurora, Ill.

The art of bleaching is not new, it was practiced by the nations of antiquity. And while the majority of bleachers may have a little difference in the method of handling the goods, and claim to have something better than their competitors, the process is practically the same, for there has been very little progress made in this art since 1785, when Scheele discovered chlorine and Berthollet tried this gas in bleaching cloth. In 1786 Berthollet exhibited the experiment to Mr. James Watt, who first introduced the new method of bleaching into Great Britain. Mr. Tennant of Glasgow, Scotland, simplified the process by applying a saturated liquid of chloride of lime, and a year later made the solid chloride of lime or bleaching powder, but within the last twenty-five years caustic soda has to a large extent replaced the lime boil. All other improvements have been in the machinery and boiling kiers which enables the bleacher to turn out a larger quantity of work. The process is not a very complicated one, and does not require a chemist to carry it out. It is necessary that he should be a man who has had long experience in the bleach house and have a good knowledge of the chemicals he is to use, and their effect on the cloth, also be able to handle the help properly and direct the work through its several stages of the process, in a proper manner and at the proper time, otherwise serious damages may occur.

There have been men high in authority, who had a theoretical but no practical knowledge, and who thought they could take any ordinary man, from any part of a bleachery or print works, and give him the routine of the work, as they knew it themselves, and then he could run it successfully, and there have been numerous cases of this kind which have ended with a great loss to the firm.

Now, the practical man, who probably has spent the greater part of his life in obtaining his knowledge of the business he may be in, does not want to be bothered with other people's theories; all he wants is actual results from practical demonstration. I don't propose to go into the full history of the process of bleaching and mercerizing, but my object is to try to show by relating a few instances that have occurred in these processes as illustrations to prove that theory is wrong and practice is right in the things I will mention.

A certain large works, several years since, fitted up a plant to mercerize cotton piece goods, plain weave of fine texture, mercerized with caustic soda, and rinsed off with cold water by the means of squirt pipes, and the goods as they came off the mercerizing machine were piled into box trunks.

A small bleach house was fitted up to bleach certain grades of work, and to take care of the mercerized goods; this building was independent from the large bleach house, for the regular run of work.

The goods were drawn from the trucks after they had been mercerized, through an ordinary bleachery washing machine, in the rope state, and from the washer, through a tank that was filled with a diluted solution of sulphuric acid or sours; from the tank the cloth passed between a pair of rollers known as a squeezer, the bottom roll was made of brass, and the top roll of iron, covered with rubber. The goods on leaving the squeezer rolls passed over reels and were plaited down into bins, where they were allowed to lay a few hours, and afterwards washed through the ordinary washing machine and then passed through the squeezer of brass and rubber rolls.

The purpose of this last wash was to free the cloth from acid, then the cloth was plaited down as before into bins, and from the bins was opened

out to its full width by one of William Birch's scutchers and then dried on the cylinder drying machine.

The cloth was full bleached before mercerizing and after the mercerizing and the washings and souring mentioned above, it was found that the cloth had a decided yellow cast and to overcome this it was found necessary to give the cloth a light chemic after the first wash and sour following the mercerizing and after the chemic it was necessary to give another wash and sour to kill the chemic. This left the cloth in a beautiful white state which was perfectly satisfactory.

This business increased rapidly, and it was impossible to give all the above treatment and at the same time empty the trucks fast enough; this, of course, left the goods laying in the trucks sometimes four or five hours, but this did not seem to have any bad effect on the goods whatever.

Now, I wish you to bear in mind that all these goods were of fine texture, plain woven, and all passed through the same process of bleaching and mercerizing and the result was considered perfectly satisfactory.

In the course of time, heavy fancy woven goods were mercerized, such as striped percales, cheviots, figured brocades, duck, etc. Some of these goods were bleached in the same room as the mercerized goods were treated and some in the large bleachhouse where the ordinary run of work was bleached but all went through the same kind of washers and squeezers.

These goods after bleaching and before mercerizing were all right, a good white and free from holes or cuts of any kind. These goods being coarser and heavier, absorbed more caustic soda than the fine texture goods and consequently needed more washing and stronger acid or sours to neutralize it, and for this reason the goods were passed through the washer and acid solution twice, then washed and chemiced and washed and soured and finally given a good wash by passing twice through the washer and after all this treatment, stains would appear from time to time when the goods were steamed after printing. Some of these goods were finished without mercerizing and showed no stains. These goods after mercerizing were also piled into trucks same as the fine goods and sometimes lay for several hours, and no bad effects observed excepting the stains referred to above.

Now the question was, what were these stains, how were they caused and how could they be overcome? The contention of men in high authority was, that they were lime stains caused in the bleaching; the contention of the bleacher was, that they were the result of some of the alkali being left in the goods and he suggested that the goods should be given a hot water wash after the cold water squirt given by the mercerizing machine.

The first few lots were all right after being treated through the hot water and went through the other processes of printing, dyeing, etc., free from stains, holes or cuts. The business so increased in this line of work that the goods had to lay as before in the trucks five or six hours. Then a new trouble commenced which was worse than the stains, for the cloth began to show up badly torn and full of holes, sometimes running a piece or two satisfactorily and then the next piece was ruined.

This went on for two or three weeks and every one in authority seemed to be at their wits' end; one would say it must be a nail that the cloth keeps catching, another would say it must be a broken pot eye or a bad reel, but no one offered a suggestion that it might be the bad method they had of handling the work after mercerizing even if they thought it; everything pointed badly against the bleacher, who, after examining all the machinery, pot eyes, etc., and finding them in good order, claimed that if it was the machinery, or pot eyes, or nails, why did it not effect all the goods and not pick out the heavy kind, but this did not unravel the mystery.

Then the highest in authority said it was caused by the rubber top rolls of the squeezer, because they were too hard, but anyone could make an impression on these rubber rolls by pressing his thumb nail against them and when a roll is in this condition it's not hard enough to cut the cloth. Anyway these rolls must come out and wooden ones be substituted. It took about a week to make the new rolls. In the meantime the bleacher had been thinking very hard, and he remembered that he once run a bleach house where he used the caustic soda process, and he conducted the first part of this process at that time by running the goods through a hot solution of caustic soda. Through the layout of this plant the goods were run into box trucks and then the trucks were wheeled near the kier room and from the truck the cloth was run over reels into kiers. He also remembered that one day when short of help, the goods had to lay in the trucks several hours before he had a boy to spare to plait them down into the kier.

When he began to run this cloth he found that all the exposed part of the cloth had become dry in places and where they were dry they were tender, he almost jumped for joy, for he felt that he had solved the mystery, he went at once to the superintendent and told him what he thought was causing all the trouble, but the superintendent did not seem to think the bleacher's views were right. Nothing daunted, the bleacher began to examine the cloth after it was mercerized and had laid in the trucks a few hours and found the parts that had been exposed to the air had become dry and was quite tender and became perforated at the slightest pressure. The superintendent was again appealed to and shown the discovery.

Then the question was, how are we to prevent it? The practical bleacher, who had nothing to do with the mercerizing, suggested that after the mercerized goods had been passed through hot water that they should be taken through a bath of cold water immediately.

This was carried out as soon as possible, and about the same time the new wood squeeze rolls had replaced the rubber ones, the damages stopped, but there had been thousands of dollars lost. The man who suggested changing the rolls said: "There, I told you so, how in the world a master mechanic or a bleacher could allow such rolls to be put in I don't know. I knew it was those hard rubber rolls doing this damage."

Now does it not seem strange that these rolls did not damage the fine mercerized goods, or the heavy goods before they were mercerized? Now a wood squeeze roll does not last many days before it needs turning off.

The boss bleacher was perfectly satisfied it was not the fault of the rolls, although he had to take the blame, so when the wood rolls went to the repair shop to be turned off, the rubber rolls that were supposed to have done all the damage were replaced, and kept there, and there were no more damages. Gentlemen, I will leave it to you, as to whether it was the rubber rolls or the effects of the air acting on the cloth in the trucks and which contained a large quantity of hot caustic soda solution that did the damage.

I will give you another illustration of how the practical bleacher is sometimes blamed for things that really do not belong to him.

In a certain works, a special kind of fabric that could not be run through the ordinary bleachery washing machine, was boiled out in soda ash and bleached on a machine similar to the old madder dyeing machine. In this way it took nine or ten men to bleach 100 pieces in ten hours, and the white was anything but good. The most of this work was dyed or printed. The demand for these fabrics increased at such a rate that it became necessary to find some way to bleach it in larger quantity and more economically.

Then the bleacher rigged up a small plant so that one man and one boy could turn out 300 pieces in ten hours. The bleacher thought that if the work done on the machine referred to above was satisfactory, that one boil in a kier under pressure would certainly be satisfactory and enable him to turn out a much larger production at a much smaller cost, so he followed this course, and turned out a much better white than was formerly done on the machine and was congratulated by the management for it.

This first order of over 2,000 pieces was printed in light styles, and some went for plain whites. The next lot or order was for dyeing; and while the darker shades were satisfactory, the lighter shades showed up blotchy. All at once everything seemed to be going wrong with these goods, patches were taken to the laboratory, tested by three or four different chemists, and all gave the same verdict, viz.: lime stains. The bleacher was told he had better not use any more lime on these goods.

Now he knew himself that he had not used any lime on these goods, and was rather surprised to hear such a verdict. He smiled and said to himself, it seems that some men who have diplomas don't know as much as they are given credit for.

The practical bleacher reasoned that the cloth with only a soda boil was not thoroughly bottomed, it needed a more thorough boiling either with caustic soda or lime. He knew he had been told to stop using lime, which he had not used, so he said to himself, I will give the goods a good lime boil, a good souring after and then a second boil in soda ash. He did this, and after the goods were bleached, they were dyed, there were no stains or blotches and everything went on fine from that time.

Now, the men who gave the verdict of lime stains either did not know their business, or were working, on that old theory, that any uneven dyeing was due to lime stains, and the bleacher's fault. I think in this case, at least, the practical bleacher showed that this theory was wrong.

I could recite numerous other cases showing that the bleacher is often blamed for bad work that he is innocent of, but I am afraid I should take up too much of your valuable time.

John Mercer, the discoverer of mercerizing, was born February 21, 1791, at Dean in the parish of Great Harwood, near Blackburn, Lancashire, England, and was employed at the Openshaw print works when only nine years old, and he worked himself up to be manager and then partner in the firm. While experimenting with a batch of calico, he accidentally let it fall into strong caustic soda, and when recovered, it had curled up, and became semi-transparent, and appeared to be on the point of solution and destruction. However, Mercer proved that the only change which took place was a contraction and consequent thickening of the fibre with lustre. This was the beginning of mercerizing and he patented his discovery in October, 1850.

Some claim bleaching should precede mercerizing. Mercer says in his specifications: "When I adopt the invention to grey, or unbleached cloth made from the fibrous material of cotton or flax, I first boil or steep the cloth in water, so as to have it thoroughly wet, and remove most of the water by the squeezers or hydro-extractor, and then pass the cloth through the soda solution." So it would seem by the words of the inventor or discoverer, that it was not really necessary to bleach the goods before mercerizing, and in this I fully agree with him, but I do believe that to get good even work it is necessary to boil or scour the goods thoroughly before mercerizing.

Now to avoid all the risk of stains and damages described in my first illustration, and all the extra washings, sourings, chemics, etc., and to economize in the bleaching and mercerizing, I have found the following process to act admirably, without detriment to the lustre of the goods:

1. Singe the goods.
2. Wash into the kier and boil ten to twelve hours according to weight of goods with the first rinse water that is used in rinsing the goods after they come from the mercerizing bath.
3. Wash out of kier and sour with sulphuric acid 1 1/2 to 2 degrees Twaddell, let the goods lay two or three hours.
4. Wash and dry.

The goods are now in a clean and well scoured condition and will absorb the caustic soda solution evenly.

5. The goods are mercerized and washed with the squirt pipes or by passing through a water tank, and this wash water is used in the first boiling of the goods.
6. From mercerizing machine, the goods are put into a kier and there is plenty of caustic soda in them and all that is necessary is to add enough cold or hot water, and boil the goods ten or twelve hours.
7. Wash out of kier and chemic.
8. Wash and sour.
9. Wash until free from acid.

By following this method you save the first cost of caustic soda and soda ash, in which to boil the goods, you also save two or three sourings and one chemic and several washings which are used on mercerized goods that are bleached first.

Next came the reading of the following paper:

Moisture in Cotton and Cotton Yarn.

CHRISTOPHER P. BROOKS, New Bedford, Mass.

The determination of the amount of moisture present is commonly spoken of as conditioning. The accurate meaning of this expression is the testing of raw stock, yarn, or fabrics as to what should be their true weight if the normal regain of moisture were added to their absolutely dry weight.

The first known adoption of any standard of regain was by the Chamber of Commerce at Lyons in France, when a standard regain of silk of 11 per cent. was declared in 1840, and sanctioned by the French government in 1841.

The first officially adopted list of regains for the various yarns was fixed at an international congress for the establishment of a uniform system of numbering yarn held at Turin in Italy in 1875, when it was recommended that the following list be adopted:

"18¼ per cent. for worsted
17 per cent. for carded woolen yarn
8½ per cent. for cotton
12 per cent. for flax and hemp
13¾ per cent. for jute
13 per cent. for shoddy yarn

the drying temperature to be from 105 to 110 degrees Centigrade."

The regains standards of the Bradford, England, conditioning house are as follows:

"19 per cent. for tops combed with oil
18¼ per cent. for tops combed without oil
14 per cent. for noils
18¼ per cent. for worsted yarns
8½ per cent. for cotton
11 per cent. for silk
16 per cent. for scoured wools"

These standards are accepted by most, if not all, of the European conditioning houses, with slight variations.

The regain of 8 1/2 per cent. for cotton and cotton yarns recommended by the international conference in 1875, is adopted by the New York conditioning houses, by the Bradford and Manchester conditioning houses in England, and the German laws governing conditioning houses.

The drying temperature named is equivalent to from 221 to 230 degrees Fahrenheit, but at the testing house in Manchester, England, where cotton goods are the ones chiefly tested, a drying temperature of 212 degrees, equivalent to the boiling point of water is adopted.

When a sample of cotton or yarn is submitted to be tested, it is subjected to drying at a temperature of 212 degrees in a dry oven so constructed as to permit of a constant and uniform temperature being maintained. It should be so arranged that the moist vapor may readily pass away.

The weight is taken when the sample is absolutely dry, and an allowance made of 8 1/2 per cent. on this dry weight. If this weight is found to be less than that of the sample before the test was made, the difference is considered to be excess moisture, and in case of a trade dispute where both parties have agreed to accept the opinion of the testing house, a rebate from the invoice is made to the extent of the excess moisture.

The amount of moisture in raw cotton depends largely upon the treatment of cotton after picking and before balling, upon the age of the cotton, and where it has been stored. The largest amount of natural moisture in cotton is found immediately after it has been picked from the cotton plant, especially in the case of cotton picked early in the season. In some districts, especially in the Sea Islands, it is customary to spread the newly picked cotton in the sun, to ripen and dry it, before ginning, but in the main cotton belt no such care is taken, the result being that the cotton is ginned while moist, tending to gin damage; but the planter ignores this in his anxiety to have it baled with as little loss of weight as possible.

In my endeavors to ascertain the standards of moisture in cotton adopted by the cotton exchanges I have communicated with the secretaries of the cotton exchanges in New York; New Orleans; Liverpool, England; Havre, France; Bremen, Germany; Alexandria, Egypt; and Bombay, India.

At none of those from which I have received replies do I find that the conditioning houses' standard or any other has been adopted. In New York there are two regulations regarding moisture. One refers to cotton damped by water used in extinguishing fire, which is a form of dampness outside of the scope of this paper; the other rule was formed to prevent the storage of cotton below the level of the street where it might absorb moisture. Such cotton is not deliverable until after it has been stored for thirty days above the street level to allow the dampness to dry out. The rule of the New York Cotton Exchange dealing with this matter is as follows:—

"Cotton which may have been stored below the level of the street shall not be a good delivery until after the same shall have been restored above the level thereof for a period of at least thirty days."

Beyond this the matter of moisture is generally regulated by custom, i. e., the receiver of the cotton at the time of its receipt generally demanding and receiving an allowance in weight to overcome the moisture. It is the duty of the receiver of the cotton, or the broker acting for him, to see that the cotton is in proper condition, or otherwise suffer the loss in weight.

There are no specific regulations in force at the New Orleans Exchange in relation to maximum allowance for moisture in raw cotton. It is the custom of the weighers for the sellers and buyers to meet at the scale and there agree upon the proper allowance, which varies in accordance with the condition of the bales. Where they cannot agree, the cotton is not weighed and delivery is not accepted until the bales are put in proper order.

The custom of the Liverpool Cotton Association is to settle by arbitration disputes as to whether cotton is damp, and if so, the allowance to be made for same. The rule there is that if the arbitrators award anything under ten pounds per bale of 480 pounds, the buyer must take the cotton with the allowance awarded; if the award is ten pounds or over per bale, the buyer has the option of returning the cotton at the market price of the day. There is a right of appeal from the arbitrators'

award to the "Appeal Committee on Damp" of the Association.

The following is the Liverpool by-law on the subject:

"If in the opinion of two qualified persons cotton turns out at time of delivery to be damp or wet, and if such arbitrators consider an allowance of at least ten pounds per bale of 480 pounds average weight, if American cotton, to be due thereon (and this shall be the ratio in cases of damp occurring in growths other than American) the buyer shall have the option of closing the contract at the market price of the day, subject to the right of appeal by the seller."

At Havre, the Syndicat du Commerce des Cotons has no specific regulation as to moisture in cotton. General disputes, however, are referred to arbitration.

As to standards adopted by commercial asociations dealing with cotton yarns, the only one that I have been able to find is one of the yarn contract rules that were at one time proposed for adoption in Manchester, England, but which I believe are not in force, reading as follows:—

"In case of disputes as to counts, length, weight, or condition, the yarn shall be tested by and according to the rules of the Manchester Testing House, and its certificate shall be binding on both parties, who, however, shall have the right to be represented when the samples to be tested are drawn."

As a rule, the most severe tests of textiles are made by war departments before accepting delivery of supplies for military clothing and other army purposes. The correspondence, however, with the United States War Department and the British War Office, elicits the reports that no account is taken as to the moisture contained in materials from vegetable fibres, so long as they are sensibly free from excess moisture, and the scrutiny of regulations adopted by the French and German War Departments does not show the adoption of any standard of moisture.

In conclusion I would say that theoretically a standard of moisture in cotton or cotton yarn should be one that will allow the material to contain and retain such an amount of moisture when the temperature, the barometer, and atmospheric conditions are normal, that cotton when in that condition will not increase or decrease in weight appreciably when exposed to the air. In order to determine such a standard it would be necessary that the humidity of the atmosphere and the temperature should also be specified.

As these conditions are constantly changing, and as different countries and different latitudes possess different atmospheric conditions, a standard of 8 1/2 per cent. regain has been widely accepted as an average condition. In my opinion this is a fair standard, allowing for almost 8 per cent. of moisture in cotton, which is as much as ought to exist under normal conditions.

An appreciably lower standard would not allow for cotton retaining the whole of its natural moisture, while an appreciably higher standard would be such that cotton so saturated would be liable to mildew. These remarks apply to cotton in its natural state or when spun into yarn in its natural state. For cotton that has been bleached or otherwise treated a different standard ought to be adopted.

I do not feel that the subject of the standard of moisture in yarns is of much importance to the American cotton manufacturer, since yarns are mainly sold in an air dry condition, but I do feel that the subject of maintaining a standard of moisture in raw cotton that should not appreciably be exceeded is worth the attention of the Association. Not only would it result in manufacturers obtaining raw cotton more free from moisture, but in time it would result in encouraging or compelling the planters to give more attention to the drying and ripening of cotton before ginning, with a result that there would be less gin damaged stock.

At this session Ex-President David M. Thompson read the following statement of his views of the present condition of the cotton industry:

Cotton conditions while ordinarily of world-wide interest, have been intensified by the experiences of the past, and the knowledge as to the present and general trade conditions. The natural unrest and anxiety respecting the immediate future, justify the most earnest effort in the acquisition of every possible information as a means of protection in the future. It may easily be accepted that few more difficult problems can be presented to the management of the spinners' interest than are involved in the effort of a solution of cotton crop conditions and such reasonably safe predictions of results within an early period as shall insure safety in the purchase of cotton supplies.

There are hazardous, unknown and indeterminable risks involved in weather and climatic conditions. There are also numerous factors of potent influence which lie within the sphere of human control. They are vital forces in actual operation and portend further and more serious disturbance and loss in the future. Aided by information from sources which impress me as of exceptional value, I have given the subject careful consideration. While the presentation of such material is an unpleasant task when it involves conditions so greatly to be deplored, I nevertheless deem it a duty to advise my friends, the members of this association —all of whom are prominent as representatives of the American Cotton spinners' interest—that I believe we are again confronted with conditions which reasonably indicate a crop for the present season not exceeding 10,500,000 bales, and possibilities of a considerably less amount in case of an earlier than usual frost.

It is a question of very serious interest to the cotton spinners of the world, among whom there exists the general feeling that our cotton crop is subject only to climatic conditions. It is an unfortunate error. The causes of very much of the present and prospective troubles are possible of removal through intelligent human agencies. Conditions during the past forty years have been steadily changing. Quietly but surely the element of detreioration of cotton seed has progressed until it has become a vital force, involving injuries which demand prompt measures of relief. Probably no sphere can be found within which there exists greater variations and ranges of human action than have attained within the area of cotton culture.

The average product of American cotton per

acre suggests the justice of the assertion, while the extremes in production, as exhibited in the analysis of conditions as they appear in the comparisons between the classes representative of the superior intelligence of experienced planters and the unfortunate ignorance of a large number of the tenant farmers, afford indisputable evidence in support of the necessity of remedial measures for relief. Apart from seed deterioration, influenced by the demand for cottonseed products, and the lack of appreciation of the necessity of careful selection and preservation of seed for planting, are the careless methods and systems employed in the preparation of land, the interchange of crops, proper fertilizing, cultivation, picking and protection during the harvest period.

As a result of the steady progress of Southern interests, its labor has become employed to the extent of almost complete exhaustion. The labor cost at the present time, as related to the cotton interests, exceeds more than three-fold the cost of twenty years since. It is a condition which compels acknowledgment, and while it may appear as the imposition of a tax upon the raw material, the spinners, the dry goods trade and the consumer must recognize it.

The opening of the present season and the increase in acreage gave promise and reasonable hope for much-needed relief. The visible cause of disturbance and deterioration due to weather conditions, the large amount of replanting and final abandonment reducing expected acreage, enters the question as a matter of serious moment. When to this is added the shortage of labor and the actual deteriorated crop conditions as they now appear over large areas, there is presented a view which gives cause for grave anxiety and apprehension of such further calamity as to justify the world's attention, and, let us hope, more especially that of American spinners, to the end that its interests may be safeguarded by every possible precaution.

In the presence of further trouble to the cotton industry, hope of recovery may seem as if almost indefinitely postponed and prove a serious injury to all other interests. If, however, the American spinner and all other cotton textile interests will promptly and diligently seek for the necssary information and act thereon wisely, insuring adequate supplies before advance of prices, then such relief and protection will be at hand as will insure our home interests from this possible impending disaster.

The world's troubles as to cotton supplies are possible of solution by Americans upon their own lands. In this interest every possible effort should be made to relieve foreign countries of their anxieties as to the future supplies and to convince them that even their interests can be best served through the use of American cotton, which is destined in the future to be very greatly improved in staple, fibre properties and grades. The opportunities for achievement and the rewards therefor vastly exceed the general knowledge and will insure to American interests permanent possession of the markets of the world.

The question in all its phrases, while apparently of primary interest to the spinner, the manufacturer and finisher of cotton textiles, very naturally and properly embraces the dry goods trade. Its representatives will conserve their interest through such careful and intelligent investigation as will enable and justify a proper recognition on their part of the vital forces involved in the issue at stake.

Readjustments are possible within lines which give promise of insurance and safety to all interests for the time is near at hand—under the conditions indicated—when the consumer will demand and take all products of the present crop upon a plane of higher prices for cotton fabrics than now exists. There are evidences of industrial and general trade improvement, both at home and abroad, with reasonable prospects of a larger demand for American products for export. The labor troubles of 1902 and 1903 have caused terrific losses, which, however, are being gradually repaired, with prospects of a period of rest.

The recovery is slow, but there are sure indications of greatly improved conditions, steadily moving into a new cycle of industrial activities of great promise. It is as true now as in the past that "every cloud has its silver lining." It is always darkest just before the dawn of a new day. Many pronounced misfortunes in the past have subsequently been recognized as almost essential and necessary in the removal of inherent or chronic troubles. There is sufficient in the present to give good cheer and a buoyant hope that our country is now entering within a new era, an epoch of industrial activity exceeding in its good fortune and distribution of rewards all experiences of the past —a steadily increasing prosperity.

The Thursday morning session was postponed on account of the general desire of those present to spend the day time in excursions through the surrounding country. At the evening session the following papers were read:

Novelties in Yarns.

GEORGE M. MONTGOMERY, Windsor Locks, Conn.

In addressing this Association on the subject of novelties in yarns, I recognize the fact that the attention of its members is engrossed in the manufacture of cotton goods alone and that they may not, therefore, appreciate just the field that is occupied by this peculiar product. I have, therefore, attempted to show, in a limited way, by the exhibit presented, some of the effects that may be produced in goods other than cotton by the use of these yarns.

I employ the term, "novelty yarns," to cover all yarns which are used to give an unusual or novel effect in fabrics and trimmings. Accepting this definition, it will be readily seen that the field occupied by the product is a large one and the materials used infinite, and its manufacture covers a period that reaches from a very ancient time to the present day.

I shall therefore attempt to give a historical outline of the development of the industry in the United States only, and in doing so, shall, of necessity, refer to such development by data drawn largely from such growth as has come to it by efforts put forth by the company with which I have

been connected, since novelty yarns began to command the attention of manufacturers in this country, The J. R. Montgomery Co., Windsor Locks, Conn.

In about the year 1876, there came into this market as an importation from France, a line of high grade woolen dress goods that contained a yarn made of worsted in two colors twisted together in such a way that the one color was placed in piles upon the outside of the other at intervals, and was called by the French manufacturers "bourette yarn," a name which has clung to it more or less tenaciously ever since, though it is now usually called by American manufacturers "worsted knotted yarn." This was the first yarn used in cloth to get the peculiar effect it gave, that had ever been introduced into the American market. The same effect had been produced in wool yarns and used in shawls in Scotland some years previous, but not imported into this country.

The American manufacturer, as was his custom in those days, quickly set about to imitate the goods in a lower grade. Thus a demand was created for the yarn by makers of ladies' dress goods containing cotton warps, which, naturally, brought it to our attention as cotton warp manufacturers. After repeated attempts, we succeeded in producing a yarn which, by reason of the necessity of the cloth manufacturers rather than its own merit, was accepted and did, to a degree, meet their requirements. After improving the machinery we produced the identical yarn perfectly. This yarn has its periods of demand and use still.

The idea of putting a color contrasting with the fabric in spots on the face of woolen goods was quickly developed by makers of both higher or lower qualities. This led to the use of silk for the contrasting color in the one case and cotton in the other, as well as combinations of two colors of these materials in the same yarn. The shape of knot was varied also. Cotton manufacturers seeking for new devices to get unusual effects very soon began to adopt the same idea, and dotted effects appeared in cotton dress goods. This was an era of knotted yarns, out of which developed the speck yarn, which, though giving much the same effect, showed between the colored spots no double and twist appearance, and is valuable in many kinds of goods.

Following these yarns came the "flake yarn," which had introduced at intervals, in contrasting colors, parallel cotton fibres. It was first used in ladies' dress goods in 1878 and has maintained its place as a favorite from that day to this. This idea was elaborated by the use of worsted, wool, and mohair as the parallel fibre in the contrasting color, as well as in combined colors.

The bunch yarns were a natural development of the flake yarns, parallel fibres being placed at intervals in balls or bunches instead of straight in the shape of a flake. The effect was produced first accidentally, and then a mechanism perfected to get the result accurately.

In 1882 there was created an unusual demand for worsted yarns, to be used in jersey jackets for ladies' wear, and on account of this unusual demand, prices for such yarns as were suitable for the purpose became abnormally high. This condition encouraged the designing of a yarn called worsted plaited yarn, a sample of which we produced on two spindles of an experimental machine, and from this sample was sold in the first order 100,000 pounds of yarn. The order was coupled with the urgent request for immediate delivery. Perhaps it is needless to say that, having but two spindles with which to produce the yarn when the order was taken, the delivery was not immediate. This plaited yarn had for its base a cotton thread which was entirely enveloped in worsted fibres. When put into the goods its character could not be detected either by appearance or feel, for nothing could be seen or felt of the cotton, which made up half the weight of the yarn. The same yarn in coarse sizes was also used in a limited way for cardigan jackets for men's wear. This is one of the many yarns which have been made to meet a peculiar condition, and when the condition changed, has been lost sight of. The change of condition in this case lies in the fact that cardigan and jersey jackets are not made or used to any extent today. The yarn is, however, utilized in a limited way in knit underwear and has the peculiar merit of not shrinking.

The same idea was used in silk, the cotton yarn being plaited with silk in the same manner as it had been with the worsted fibre. These yarns were used for needle embroidery and also for the embroidery on the back of gloves. It has been almost entirely superseded by mercerized cotton yarn.

By far the most sensational and popular feature ever introduced in the woolen goods market of the United States was the importation almost simultaneously from England, Germany, and France, in 1883, of goods in which a yarn appeared upon the surface in the shape of rings or loops and made of mohair. The American manufacturer was wholly unable to make the goods, for lack of facilities in producing the yarns to get the loop effect, and a great demand arose very quickly for such yarn. This demand was partially satisfied by importation. There being no machinery in the country suitable for its production, it was necessary to build new and adapt old for the purpose. The consumption of the "boucle yarn," as it was called in France, at that time was enormous, it being used in both ladies' dress goods and cloakings. It is still popular and in periodical demand, being used on the face of goods and often gigged out.

In 1885 another creation, and this also from France, came into the American market in the shape of what is called "beaded yarn." It is made by placing at intervals upon the surface of a cotton or silk thread a drop of a chemical compound, which, upon hardening, had in every way the appearance of a glass bead. It was made in both black and colors and was one of the most ingenious yarns that has ever been produced. It was used in silk grenadines and many other kinds of goods where the fabric was open, and more widely used in veilings than anywhere else. It is not, however, a practical yarn to use in many goods and has almost entirely disappeared from the market.

In 1886 began the manufacture of metal yarns. Under this head are included all yarns or threads in which metal is used to get an effect. Though these yarns were first successfully produced in the United States in 1886, it is interesting to know that yarns of a similar character have been made for centuries. Indian and Chinese stuffs were, from time immemorial, woven with gold. The Israelites wove

gold with their colored woolens for the use of the sanctuary. They probably brought the art from Egypt. They cut their gold, for wearing apparel, into thin sheets and did not draw it into wire as is translated in Exodus, thirty-ninth chapter. This reference to its use, which according to accepted chronology, was in the year 1491 B. C., is the earliest in history.

The historians of Alexander the Great (356, 323 B. C.) continually named gold as a material of dress. The hangings of scarlet, purple, and gold used at the nuptials of Alexander and at his funeral (his pall being of the same material), point to the fact that gold was a recognized element of splendid textile weaving at this date.

Attalus II, King of Pergamus (220, 138 B. C.), was credited with being the inventor of gold weaving, but this must have been a mistake, as it was practiced long before his time. As, however, the flat gold was probably that woven before his time, it is possible that he may have invented or patronized the making of thread of gold by twining or wrapping it around flax or cotton. This is in exactly the same way as the gold thread of today is manufactured. It is, therefore, fair to suppose that the beginning of the making of this kind of novelty yarn occurred about the year 220 B. C., or about 2,200 years ago.

Up to the year 1680 A. D., pure gold had been used to make gold thread. At that time the plating of copper with silver and gold began. This is in every way the tinsel of today. Numerous samples of goods made from the fourteenth to the sixteenth century, containing gold thread, may be seen at the Boston Museum of Fine Arts.

In the exhibit of metal yarns here shown there are included brilliants, used for portieres, upholstery goods, and embroidery; metal threads, used in braids, military goods, and dress trimmings, both of which are made with tinsel while the boucle and milanaise are made with fine wire, and used in dress and bonnet trimmings. Metal threads were first produced successfully in this country in 1890.

For the past ten years few absolutely new kinds of yarns have appeared, though many have been designed which give new effects but are found upon analysis, to belong to some of the classes already developed and capable of being made on machinery already constructed; also, combinations of two or more old kinds.

Some idea of the multiplicity of designs may be had by consideration of the fact that novelty yarn manufacturers of this country are producing today over 15,000 designs of yarns, any one of which they may be called upon to produce at any time. There are used in producing these designs, cotton, wool, worsted, silk, and mohair in various shapes, as well as the noils of these fibres, metal, ramie, chemical compounds, flax, glass, grass, artificial silk, and all the above fibres and materials in all colors and combinations of colors, as well as being printed. These fibres are also used in combination with each other.

When the attempt to establish the industry in this country was first made, it was argued that it would never be possible to produce the variety of sizes and styles of yarns needed to make the effort successful, as there was no machinery or skill available to properly prepare the great variety of materials, or put colors on such materials, to give the novelty yarn designer and manufacturer sufficient latitude to produce the many kinds of yarns required, to say nothing of their inability to make the yarns after the stock was prepared.

It was said, and truthfully, that it would be necessary for the novelty yarn manufacturer to produce a small sample to match one desired, a very potent difficulty where stock-dyed fibres were necessary; then estimate the cost and yardage of it; next furnish a small working sample of a pound or thereabouts; and finally, to produce in quantities. All of this, it was thought, would never be practical.

To illustrate how fully the desired conditions have been met after an experience of twenty-five years, it is only necessary to say that among the many thousands of novelty yarns the manufacturers are prepared to make today, the weight varies from 100 yards to the pound to 20,000 yards to the pound; that they are prepared to furnish a pound or ten pounds (for the purpose of sampling) of any one of them, and in quantities to meet the demand. They undertake to imitate any yarn sent them, and are often asked to construct a yarn from a drawing, and very commonly to imitate a yarn taken from one piece of goods to give a similar effect in another.

There is no machinery in a cotton mill, from the picker to the spinning frame, that is not applied in an unusual way to manufacture these yarns, requiring many attachments, and some of the machines when fitted with their many attachments would hardly be recognized by one who had seen them in their original shape, making the product they were designed to. This is particularly true of the spinning frame and twister. Special machinery is necessary to produce many of the yarns shown in this exhibit, notably those where metal is employed. Machinery was specially designed and built to make the beaded yarn, which must be operated in a room where the atmosphere is artificially influenced.

I believe the American manufacturer is today able to produce any yarn to give a novel effect that has been made abroad, and that the time is not far distant when the American designer, having at his command such facilities as are afforded him, not only by the novelty yarn manufacturer, but by the weaver, the dyer, the mercerizer, the printer, and the finisher, will be able to rival any fabric made abroad, and it remains for the American manufacturer to exercise his ingenuity and skill, in using these facilities, with courage and perseverance, to press forward in his attempts to produce fabrics that will satisfy the finest and the best demands in the market of the United States, the most discriminating market in the world. When our manufacturers can do this, we will find foreign makers copying our styles, our yarns, and our goods. Then, and not until then, can we rightfully claim a skill in producing fine goods equal to any in the world.

The manufacturers of cotton in New England should turn their attention to the making of finer and more delicately constructed goods, where skill in design, multiplicity of color, and completeness of finish are employed, to the end that a fabric may be produced whose delicacy of texture and harmony of combined colors are unexcelled. With such a fabric they can enter and control the markets of the world on this class of goods as completely as

the Southern manufacturers command those markets on the coarser and cheaper products. This seems to be the logical future of the cotton manufacturers of New England, and to meet that future successfully, we should all strive, persistently and intelligently, using everything that skill and ingenuity can contrive, to bring about that profitable and glorious result.

The Preparation of Warps.

ARTHUR N. HERSOM, Lowell, Mass.

I believe that we can all agree to one thing that in order to have good running warps, it is necessary to have first class yarns.

While I do not intend to go into this in detail, as enough could be written about yarns to fill columns, I will touch on just one phrase of this, to illustrate this point.

Does it necessarily follow that a yarn which will equal or even exceed the standard breaking test, will be a good weaving yarn?

I answer from my own experience, no.

I would rather go through a mill and watch the yarn, beginning at the spinning-frames, and follow it through the processes of spooling and warping, and then form my opinion from what I can see in these processes of manufacture, than to form my opinion of how these same yarns would weave, from the sizing and breaking reports.

When I see a spinning room running with very few ends breaking down, the spinners having plenty of time to attend to their roving, cleaning and other duties as well as to have a suitable time to rest, then I exclaim, surely that yarn is running fine and if not spoiled in the following processes, it must run well in the weaving departments.

While I think it is necessary to have the yarn tested every day, still it does not show or prove that the yarn which shows the highest breaking strength will weave the best.

This statement I make, and no doubt you have all experimented on this line, and found that by taking out twist the breaking strength of the yarn can sometimes be improved, but what will be the results in your spinning and following processes?

Poor running spinning, spinners can't keep their ends up, spoolers can't keep the work up, warpers stopped on account of ends breaking down, more waste, cost per pound higher and poor results in the weaving. This brings me now to a department which I believe is greatly neglected, and where after getting good yarns, by being very careful in all departments, beginning with the cotton, it can and is in a great many cases so poorly slashed that it is impossible to get good results in the weaving.

Let us look for a few moments at the slasher from the mechanical side.

Of course all cloth mill men know perfectly well how a slasher is constructed and what work is required of it, but how many stop and think if their own slashers are made and run so as to get the best possible results?

How many of the mills today that are weaving fine combed yarns, who have slashers constructed so that they run with the least possible strain on the yarn, thereby leaving all that can possibly be left of its original elasticity?

How many of our coarse mills are there today that pay really any attention to this principle of good slashing at all.

Or, in other words, leaving all the elasticity in the yarns you can?

There are slashers running today on coarse and medium counts of yarn, that do not have any side-shaft-drives, thereby bringing the additional strain on the yarns of pulling the heavy size and squeeze rolls, besides turning two cylinders, which are mounted on truck bearings, instead of being equipped with roller or ball bearings.

Please notice the amount of strain on the yarn required to start the cylinder (without any other strain), that is mounted on truck bearings, and see what might be saved by having them equipped with roller bearings.

The following table taken from tests made by the Lowell Machine Shop, under different conditions, shows the pull in pounds required to start the cylinder:

Truck bearings, 4 trucks (best condition)	5.42
Truck bearings, 1 truck, clogged	10.12
Truck bearings, 2 trucks, clogged	12.96
Truck bearings, 3 trucks, clogged	15.93
Truck bearings, 4 trucks, clogged	19.15
Roller bearings	.68

This is by no means all the friction which it is possible to have on these machines equipped with truck bearings, for the face of the trucks being so much narrower than the journal, they wear into the journal, causing a friction on the connecting pipes, and in some cases worn so the journals rub on the frame also.

With the roller bearing, there is so much more wearing surface, and being self-oiling as well, there is not any perceptible wear on either journal or rollers, so, if the slasher is kept level, the friction is reduced to the smallest possible amount.

This leads me to make the statement, that all slashers should be equipped with roller or ball bearings, and side shaft drives, to take off all possible strain from the yarns, during the process of starching and drying.

Now I will go one step farther, if it will make better weaving yarn by using roller bearings and side shaft drives, why not in case of slashing fine numbers or a light sheet or both, is it not wise to attach a positive cylinder drive (using one cylinder), so that the yarn won't have any strain on at all, except to separate it, and wind it on the loom beam?

It is a surprising thing to me to know that in some of our mills, they have not got their machines equipped with all of these new improvements, which will certainly give them large returns for what money it would cost, to put them in the best of condition.

I have seen slasher tenders who had in a light sheet of fine combed yarn, trying to start up their machines and after being as careful as possible, see the yarn snap and break in the lease rods, thereby, either running in double and not separated, or snarl up in the comb, making a breakout, which if allowed to go to the weaving-room, means that the weaver has to piece on bobbins, or else draw down the warp until the ends are found and drawn in again, or the warp taken out and all drawn over.

In one case it means loss of production, and pos-

sibly seconds, in the others it means loss of production, waste of valuable yarn, extra cost, and probably a remnant.

Now, if there is strain enough to break the yarn, then there is strain enough to take out all the elasticity, which if left in it would make it weave better, thereby making it easier for the weavers, increasing your production, reducing the cost per pound and the proportion of seconds also.

If the best results are expected, it is absolutely necessary that the warps should be prepared under the very best of conditions, and are first-class in every respect.

Why not after making good yarns, see that the slashing department have everything that is necessary in shape of equipment so that it will be possible for the man in charge to deliver warps to the weaving departments as near perfect as it is possible to make them?

After getting the slashers into good condition, there are many things which will tend to make the warps run badly in the weaving but I will only mention several of the most important ones.

I will pass over the subject of sizing compounds, for there are a great many on the market today and almost every mill-man has some favorite preparation which he thinks is better than his neighbor is using.

Be this so or not, it is true that there are many good compounds being sold today and in each case the mills using them claim to be getting the best of results.

There could also be a great deal written about starch and the several varieties, also about press rolls, but I will not go into details on these two subjects.

The question of power saved, I will also pass over.

Another matter I wish to bring to your attention is the running of a very light sheet, either on a one cylinder machine or on the large cylinder of a two cylinder machine.

The principle applies in both cases.

A great many are using what is called a "Yoke" and I have seen it used quite successfully on coarse yarns.

What I believe is a better combination (for fine work especially) is to have a warper so arranged that beams that are not over 36" spread can be used, and not warp over 300 ends on them, so as to get a good separation in your lease-rods, and still have a sheet solid enough, so the yarn will not roll or twist, as it goes upon the cylinder.

Yarn on a slasher cannot be separated sidewise, only each beam from one another (unless a lease-reed is used at the back), and in case of yarn being contracted with either a "Yoke" or "Taper" it brings it together sidewise, and unless it should all happen to get separated in going through the comb, it will catch in the looms and either cause bad places in the cloth or break out entirely.

Supposing it was desired to run 560 ends of 70's yarn in the slasher.

If it is warped on two beams of 36" spread, 280 ends on each, a sheet that won't roll or twist will be obtained and can be run just the same as any sheet, or the same as if 2,200 ends were warped on 54" spread.

In the case of 2,200 ends of 70's yarn to slash and it was desired to put that on the loom beam, in the best possible condition, warp it with not over 500 ends on a 54" beam.

Put 5 beams (440 ends on each) into a side-shaft-driver slasher, on one cylinder with a positive drive, so that there is only strain enough from the size-rolls to the cylinder to keep the yarn straight.

Have only cloth enough on the delivery-roll to keep the yarn tight enough to separate in the lease-rods, then there is nearly all of the original elasticity in the yarn if wound right on the loom-beam and properly sized, it should be in the best possible condition for weaving.

What I intend to impress is that all of the elasticity should be left in the yarn that is possible, for I certainly think it is necessary to get good results in the weaving. Webster defines "Elasticity" as: "A property in certain bodies by which they restore themselves to their original form and dimensions, after the external force by which they have been delated or compressed or bent."

Looking at it from a mill-man's standpoint, I should define it as "Weaving Quality."

As I said in the first place, "I believe the slashing department has been greatly neglected, and if so, why not get them up to date, so that after making first-class yarns, the Preparation of the Warps will also be first-class.

Roll Covering.

WILLIAM R. WEST, New Bedford, Mass.

In writing this paper it would hardly be worth while to go into the modes of roll covering, for the reason that this industry is so well known to the manufacturers, and so for that reason we will confine our subject mostly on the line of suggestions.

Top roll covering today is a different problem than it was twenty-five years ago. Up to about fifteen years ago there were but two kinds of leather; one was calf skins, or better known as kip or winding leather; the other was sheep or lamb skins American tannage. These two grades of leather covered all kinds of top rolls for all numbers of yarns. There were two grades of cloth, mostly white cloth, twenty ounces to the yard. The machinery consisted of a speed lathe and a small press, the lathe for rubbing the ends down, and the press for cementing the cots. Cots for the large rolls were twisted on by hand.

In writing a paper on roll covering, there are a number of points that would be interesting to a roll coverer, but which would not appeal to a manufacturer. I understand that the roll covering bill is one of the largest, if not the largest bill that the mills have. For that reason I think that it would be right for me to make some suggestions in regard to the handling of the rolls in the mills. The rolls should be removed from the delivering places and sent to the rooms in which they belong as soon as possible. I have known the rolls to remain in the entry for three or four days, and sometimes a week. The leather which we use is very susceptible to dampness, especially the calf skins, for the outer surface is removed by buffing to make the roll true and in order to take the varnish.

Today we use a number of different skins; there are several kinds of skins for the different grades of

yarn. We have the Persian goat skin, which is very soft and of a very fine grain and is adapted for light weighting machines and fine numbers of yarns. Then we use the Welsh, English and American makes of skins. The calf skin is confined to the larger rolls, as drawing, combers, etc.

We find that the same skins will not do satisfactory work on different makes of machinery. What will do on one make, will not do on another. We find mills that can run a soft roll, from a drawing head to the mules and frames, and a mill doing about the same work calls for a much harder roll, as the soft ones will not run. It will come loose and flute, thus causing all kinds of trouble. We claim that the mill that can run the soft roll has the advantage over the one which must have the hard roll; the roll coverer being able to get a much more even roll than he can by straining the leather.

In selecting roller leather, the merits of the various kinds offered to the trade required to be studied, the price and size should not be the only guides. No two makes of roller leather are alike either as to their mode of manufacture, or as to the result they attain.

A roll coverer should confine himself as close as possible to one make of skins, for we find no two makes which will work the same, and the coverer is less liable to mistakes.

Skins which feel rough or coarse grained when lying flat upon the table should not be used for medium or fine spinning, it is very important to have the skins as level as possible.

The cloth that we use is from 14 to 50 ounces to the yard. But in my opinion, the cloth should not be over 38 ounces to the yard. Anything over that has a tendency to make the roll uneven and impairs the life of the roll. The 50 ounce is sometimes used to increase the sizes.

For finer spinning, we find that a good cushion is essential; it gives the roll a better chance to lay down to the steel roll with lighter weight. We have had mills that wanted rolls covered for fine spinning to compare with some other mill. We have tried the experiment and found that the roll will not give satisfaction; the machinery not being adapted for that kind of roll covering. The iron surface of the roll is first covered with a specially woven woolen cloth which is cemented to the roll, giving a good elastic foundation; then a leather covering which fits tightly is drawn over this foundation. The roll is capable of gripping the fibres, and owing to the yielding quality of leather and cloth, does not damage the fibres. A roll coverer should see that the cloth is even. We find by changing from one make of cloth to another, that it varies in thickness, although it may weigh the same, so we should, as far as possible, confine ourselves to one make.

A few words on fluting top rolls. It is hard for me to say just what causes fluted rolls. We will cover rolls for months and sometimes years, and all at once it will start to flute; but I have never seen the entire lot flute at once; it is generally a small percentage of them. At the same time the roll coverer has used the same stock and cut the leather the same tension. Most of the mill people think that is poor stock, but we find that it is the best part of the skin which flutes, and that the flanks will not. Some tanners skins are more susceptible to fluting than others. We do know that damp and muggy days will cause rolls to flute. Mills that are troubled with fluted rolls should keep them in a very dry place, for if they collect moisture, they will cause more or less trouble. The roll coverer not always being at fault. The argument we often hear is, that the top and bottom rolls are the same in diameter, but we find that that is very seldom the trouble.

VARNISHING TOP ROLLS.

We suggest that in varnishing rolls, to use a pad instead of a brush. You will put it on more evenly and are less liable to open the cots, and it should not be done before an open window on damp days. The point is, that if the cots open on account of dampness or careless varnishing, there is but one remedy for it, and that is that the coverer has got to slacken the tension of the cot, and that would shorten the life of the roll. Then I should recommend good cider vinegar in the place of acetic acid in the varnish.

In some cases the acid is used so strong that it will separate the grain of the leather, thus causing the varnish to peel off.

In covering top rolls, I find that different coverers have different opinions in regard to covering. The opinion is that any small place is good enough for a roll shop. It is very essential to have a light and dry place, and the latest improved machinery. The help will do more and better work. The manager or foreman of the shop should see that the machinery and the benches are kept clean. One will find as much work done at the end of the week, and a more cheerful place to work in. An enterprising roll coverer will keep his machinery up-to-date and in good repair.

The Prevention of Filling Waste.

E. C. FOERSTER, 415 Broadway, New York.

Waste of material in process of manufacturing will always remain a necessary evil. While the complete removal of this burden is impossible, its reduction to the lowest terms should be the aim of every manufacturer. There are few textile processes in which waste of material does not occur. In none is it a more serious factor than in the weave room, where the extent of the waste of filling depends both upon the care exercised by the operative and upon the action of the machinery. The material on the bobbin or cop has been converted into yarn and thus represents the cost of the raw material and of all the expensive processes that precede weaving. A loss of material here is, therefore, more serious than in any preceding process. By passing from the shuttle into the cloth the object for which the yarn was made is attained. Any part which may fail to reach the cloth becomes practically worthless and represents the loss of cotton, labor, and all the other expense that has been incurred in making the yarn, such as supplies, interest, depreciation, rent, insurance, taxes, etc.

Yarn in the cloth may be worth forty cents or more per pound. In the form of yarn waste it is worth virtually nothing. In the weave room not only is the loss per pound of waste larger than at any previous stage, but it is here that the aggregate waste of material is the heaviest. For these rea-

sons the weaving process offers the most promising field for economy of material.

The filling stop motion and the corrugated bobbin have been in use so long that few, if any, can remember when they were not in use. Both are important waste savers. The stop motion can be used with any kind of filling, but the corrugated surface, to prevent the slipping of the filling, is adapted only for bobbins. This leaves cop filling, which is usually the most expensive, to be wound on a smooth surface and subject to all the waste that that condition implies. The evils resulting from the smooth surface of the cop, as at present used, are so well known that it is not necessary to explain them to such a representative body of textile manufacturers as is now before me. Mentioning the subject of cop filling is sufficient to bring before you a picture of broken cops, smashes, waste, imperfect goods, and loss of production. I want to call your attention to my remedy for these troubles with cop filling. It is so simple that the illustration of the device is alone sufficient to explain its operation.

The shuttle spindle is split from the base to a point a short distance from the end. When in position to receive the cop the two sections of the spindle approach each other so that the cop drops easily into position. When the spindle carrying the cop is lowered into the shuttle the two parts forming the base are pressed apart by a suitable device, causing a pressure which holds the cop firmly in position. This pressure is sufficient to hold a cop on a smooth spindle, but the corrugations at the base of the spindle make slipping still more difficult. At present the operative forces the cop on the old solid spindle in the hope that it will stay in place. In doing this the yarn is often disarranged and damaged. The friction thus created disappears upon the slightest slipping and thus allows the cop to fly from the spindle.

With the new device, however, the pressure of the spindle on the cop is maintained as long as the spindle remains lowered in the shuttle and is released only when the spindle is raised. The "Neverslip" Cop Spindle, as the new device is called, is manufactured by the Neverslip Cop Spindle Co., and I submit this brief description of it in the belief that as a waste saver it will rank with the filling stop motion and the corrugated bobbins.

Electricity in Textile Mills.

CHARLES ROBBINS, 5 Nassau St., New York City.

The importance of constant speed in spinning and weaving is well known. Good work and a maximum production depend upon constant speed, and it is the universal opinion that should the smallest variation in speed take place in the engine or shafting it will seriously affect the operation of the spinning and weaving departments.

When the first alternating current generators, for use in connection with existing steam engines, were built and operated, it was found that a single machine would operate with entire satisfaction; when, however, it became necessary to operate two machines together for increased capacity, or in what is technically known as "in parallel," there developed conditions which caused a periodical transference of the load from one generator to the other. Electrically speaking, this is known as "hunting." After carefully investigating the causes which produced this result it was found that the engines had a periodical variation in rotative speed during each cycle of operation. This trouble was due to the angularity of the connecting rod and to the extreme variation of torque upon the shaft at each piston stroke. This condition led to the study of the subject by engine builders so that at the present time they are able to furnish an engine for driving electric generators which do not vary more than 1/30 of a degree from absolutely uniform rotation, which engines are usually heavier and of a higher speed than found ordinarily in mill work. This "hunting" in a mill engine is similar to a see-sawing process, a surging forward and backward, which is still further amplified by belting, and when transmitted to the spinning frame has a tendency to break the threads resulting in a decreased production of yarn.

It is evident, therefore, that an engine or turbine for operating an electric generator will furnish a more uniform and steadier speed than the regular mill engines, and if this uniform speed is available at the spinning frames and looms then an increased production with a more uniform quality of work must result. In so far as observation goes this is true. Electrically driven mills undoubtedly turn out more work and of a better quality than those driven by mechanical means.

The ideal power plant is one that is so laid out that each unit is working at its maximum efficiency at all times, requires a minimum amount of attendance, occupies the least possible space, at the same time of such a design that it may readily be extended and when so enlarged have any or all generating units supplying power to any and all points, irrespective of location of power, demand or distance. This condition is best met by electric transmissions.

If electricity is adopted as a method of transmitting power, the plant may be installed at the most convenient point, which may or may not be attached to the buildings or it may be placed any reasonable distance from the mill, thus permitting the mill to be located at a point which is most desirable on account of land, transportation, help, light, etc., whereas the power plant may be installed with a view to its location as a power generating station, irrespective of the point where the power is to be used, thus rendering available many water power developments which could not otherwise be used commercially.

The units used in an electric power plant may be installed of the right capacity to do the work in hand and all future extensions may be made when required without altering or in any way disturbing the original installation, and future additions will work together, each unit operating its share of the load in proportion to its capacity. Often this increase in units will not require an increase in attendance. If desired the initial installation may consist of two units, each of sufficient capacity to normally carry from 70 to 75 per cent. of the total load at its most economical point of operation, and in the event of an accident to either of the prime movers the remaining one could by reason of its overload capacity carry the entire demand for

power until such time as repairs were made on the damaged units.

The space required by the engine driven electric generator is but very little larger, in fact, usually no larger than a similar Corliss type of engine, and if the steam turbine is used, much smaller, and with the turbine, the foundations will be considerably less than with the Corliss engine equipment. The necessity for belt towers, heavy main shafts and belts, and all of the details which go with a rigid belted system are avoided, as well as the loss of power consumed by these belts and shafts, permitting lighter walls and detail of building construction.

The enormous use of electricity as motive power in street railways, in industrial establishments of all kinds, and by electric lighting companies, demanded the most economical generation of power in the prime mover, and today engines and steam turbines are in operation using much less steam per horse power than was considered possible a few years ago. Therefore it is fair to credit the use of electrical power with some of the great improvements now existing in steam apparatus.

Owing to the intimate relation existing between steam turbines and electrical distribution of power, it seems proper that we should discuss briefly this subject of steam turbines. The first commercial development of the steam turbine took place in England in 1884, by the Hon. Charles A. Parsons, and within four years turbines of an aggregate capacity of some 4,000 horse power were in operation. Up to the present time approximately, 200,000 horse power are in operation throughout England. It was not until 1898 that the Parsons turbine was introduced in America by the Westinghouse Machine Company. An estimate which is conservative, places the combined use of turbine generators now installed at about 300,000 horse power, and on order one-half million horse power additional.

The turbine development is by no means confined to a single company, it having been taken up in this country by several manufacturers, two of which were organized to manufacture steam turbines only and the other companies have been manufacturing steam engines. It will, therefore, be seen that the engine builders realized the rapidly increasing demand for steam turbines which in the end will materially affect their production of reciprocating engines, and for this reason are taking up this form of prime mover.

The general principles of steam turbines are undoubtedly well known to the members of this organization and for this reason we will not dwell upon the details of construction.

The partial success of the steam turbine as a power generating device lies in its extreme simplicity, it having a rotary motion without reciprocating parts, and owing to the high speed at which the turbines run, the moving elements are much lighter than those existing in steam engines of equivalent capacity.

An important detail in connection with the turbine is that no internal lubrication is required, consequently the condensed water may be returned directly to the boiler; thus, the cost of feed water and the necessity for a purifying process is eliminated. It follows, therefore, that considerable saving in operating expenses is made as well as the item of cylinder oil, while the cost of bearing oil is really insignificant.

In a particular instance on which data has been obtained, after several years of operation the cost of oil for a 600 horse power turbine is approximately five cents per day of twenty-four hours, which, we believe, is hardly ten per cent. of that usually required by a reciprocating engine of equivalent capacity.

The space occupied by the horizontal type of turbo-generator is in the neighborhood of .6 of a square foot per electrical horse power, or, to state it another way, approximately two-thirds of that required by the vertical type, and one-fifth of that required by the horizontal type of piston engine of the cross-compound Corliss type operated in connection with Condenser. The height of the turbine is about two-thirds the height of the horizontal and three-tenths of that of the vertical engine.

Owing to the uniform rotary motion and perfect balance of the turbo-generator a foundation of only sufficient size and depth to support the weight of the outfit is required, it not being found necessary to use foundation bolts. It is, therefore, apparent that a very large saving in the cost of foundations is made when compared with Corliss engines of either vertical or horizontal type.

The steam economy of the turbine is another of its important factors and it is well to know that this does not vary much with the size of turbine.

A further feature which is of considerable importance in some classes of work, perhaps not pertinent to cotton mills, is that from half load to 125 per cent. load the steam consumption is almost a straight line.

In a recent test made on a 600 horse power Westinghouse-Parsons unit by a well known firm of engineers some interesting performances were shown, and as it is fairly representative of the operation of the steam turbine, we have made some extracts from this test.

When operating with 26.9 inches of vacuum and with dry saturated steam at 150 pounds pressure, a water rate of 14 pounds per brake horse power was observed. By increasing the vacuum to 28 inches the water rate was decreased to 13.63 pounds per brake horse power, which was further lowered to 11.17 pounds per brake horse power by the use of 180 degrees fahrenheit super-heat. It will be seen that the gain due to 1.1 inches vacuum at full load was 2.4 per cent. and the gain attributable to 180 degrees fahrenheit super-heat, 10.5 per cent.

The thermal efficiency obtained in this test for dry saturated steam was 17.22 per cent. and under the same conditions with super-heated steam, 19.3 per cent.

In another test, under regular operating conditions on a 1,500 kilowatt turbo-generator, the steam consumption was found to be 14.23 pounds per electrical horse power, and the corresponding coal consumption (with Georges Creek "Run of Mine" coal) 1.23 pounds per electrical horse power, using steam at 155 pounds pressure, 42 degrees fahrenheit super-heat and 27 inches vacuum.

Still another test, on a similar turbine, but with 28 inches vacuum and 140 degrees fahrenheit superheat, developed a water rate of 12.66 pounds per electrical horse power, which is equivalent to 10.75 pounds per indicated horse power on the basis of a total efficiency of 85 per cent. for the generator and steam engine.

It is a well known fact that steam engine economy is dependent upon the excellent condition of the engine, and to maintain this condition it is

necessary to take frequent indicator cards and to make adjustments of valves, piston heads, etc.

The economy of the steam turbine does not seem to be affected by years of use. Observation has shown that there is practically no wear on the bearings whatsoever, seeming to show that the friction load in the turbine is very small.

A well known engineeer and operator has characterized the steam turbine as "fool proof" and we believe that experience shows that undoubtedly it is the simplest form of prime mover extant, and therefore should be of interest as a means of power generation where it is desirable to lessen the cost of power and attendance.

Owing to the small size of the steam turbo-generators, the cost of building and the space occupied thereby is materially lessened as compared with other forms of engines and generators, and it is interesting to note that a great many manufacturers have installed turbo-generator auxiliaries in connection with their main steam engines in a space which, while sufficient for the turbine outfit, was inadequate for a new engine.

We believe that the turbo-generator offers opportunities to many operators of cotton mills to increase the r power facilities without increasing their engine room space. In some manufacturing establishments it has been found desirable from the point of economy to retain a portion of the present direct steam engine drive and install additional power by means of electricity, operating distant or outlying loads by electric motors. This provides means for shortening long lines of shafting, eliminating angle or other difficult mechanical drives, thereby decreasing friction losses and materially increasing the plant economy.

We now come to the distribution of power to the different departments in the mill, and it is to be noted that the transmission system consists of small copper wires of suitable diameter to carry the necessary power. These wires when once installed are permanent, require no maintenance, and do not require special provision for supports. It is obvious that this method of transmitting power is one of great flexibility, and the use of electric motors permits the exact amount of power necessary to be applied at the very point where required.

The alternating current motor has the widest use in textile mills for the reason that its design is so simple, in fact, consisting of only three main parts: the stationary portion, the revolving element and the bearings. There are no moving electrical contacts and as a consequence the only attention required is to keep the motor clean and to properly fill the self-oiling bearings.

One of the characteristic features of an alternating current motor is its automatic regulation, requiring power only in proportion to its output and being capable of sustaining, should occasion demand, large overloads without injury. Owing to the inherent design of this type of motor the uniform rotative speed of the prime mover is available at the work just as though it were directly geared, and thus a gain in production resulting from a steady and even speed.

The question of sub-division of line shafts is one that is best disposed of by taking up each individual case and selecting motors of such capacity that a minimum amount of belting and auxiliary shafting will be required, at the same time reducing the friction to as low a factor as is consistent with a proper financial outlay.

Where the electric system is used, a factor of value in some instances is that if a break-down should occur only a small portion of the mill would be affected, and such sections as it may be desired to run independently can be so operated without respect to any other and without operating main drives as is found necessary with a mechanical system.

On account of the general improvement in textile machinery many mills have found that an increased production could be obtained by running their machines at a higher speed, involving an increase in the speed of the line shafts. While this can be accomplished successfully by changing pulleys, the increased speed means an increased demand upon the engine and oftentimes, due to the lack of capacity, this condition could not be complied with on account of the increased cost all along the line; whereas, if electric motors were used for driving the shafting it would be a small matter to change the size of the motor, and if the increase in speed is general, it may involve an increase in the power house which can be accomplished by the addition of a new generator unit much more readily than by changing the engine in a mechanical drive.

In a small mill where it is known with a fair degree of accuracy that the conditions will not change and where the character of the product is such that no change in speed will take place, a mechanically driven mill with a centrally located steam engine will undoubtedly be as economical and its initial cost less than an electric installation.

With the improvements in textile machinery, the higher speeds and the changing market, there are but few men who believe that such a mill is representative of the industry.

In other instances mills are laid out with a view to extensions, and on account of the inflexible conditions existing in engine driven mills, a large engine has been installed operating at from 50 to 60 per cent. of its rated capacity, which sometimes means that a single cylinder of a cross-compound engine is installed and that during the early operation of the mill the power plant must be running at an uneconomical load, which of course greatly increases the cost per horse power per year. The main shaft and transmission details must be of such a capacity that they will transmit the whole power should occasion demand it in the future. This involves a large initial outlay upon which interest, depreciation and insurance are increasing the operating cost per horse power.

There are other mills consisting of a number of buildings, each having its own power plant and inflexibly connected to its own lines of shafting, and therefore unable to supply power to any other building or to help out in the event of other engines being under-loaded, over-loaded or disabled; thus some of the power plants are running at uneconomical loads together with increased attendance, repairs and maintenance, also greater space required by the several plants that might be profitably used for manufacturing purposes if a single power plant were possible as with the electric drive.

A matter which may prove of some interest to the Association is that, recently, there has been placed upon the market a variable speed alternat-

ing current motor suitable for the operation of cloth printing machines, tentering machines and drying cans. The speed control is accomplished in the motor and is much simpler than previous methods of electrically operating the above class of machines; particularly is this true of printing machines.

It is a well recognized fact that good lighting is an essential consideration in the manufacture of textile materials and goods in general. This is particularly true of the weaving shed, where special attention is always given to proper lighting effects and where frequently saw-tooth construction is used. You are all doubtless familiar with the arc lamp and incandescent lamp; it will, therefore, not be necessary for us to discuss this form of illumination. We are, however, pleased to call your attention to a comparatively recent development in the art of electric illumination and in this respect we refer to the Nernst lamp.

This form of light is well adapted to the lighting of cotton mills on account of its pure white light, which resembled daylight, its steadiness and cleanliness. The lamp was primarily designed for operation on alternating current, and it is especially adapted to the varying conditions which exist in textile manufacture, on account of its flexibility in candle power, the range of units being from 25 to 500 candle power. This flexibility permits of the proper choosing of units so that a uniform quantity of light may be had throughout the mill.

The efficiency of the Nernst lamp is about double that of the incandescent lamp and is approximately on a par with the arc lamp, and since it is designed for operation on 200 to 220 volt circuits, the cost of electrical conductors is considerably less than for incandescent or arc lighting.

In addition to the above, a paper on Automatic Feed Water Regulators and Low Water Alarms for Boilers, was read by John Oldfield, Boston, Mass., also a very interesting and lengthy paper on Electric Measurements of Power Required in Cotton Manufacture by Edward W. Thomas, Columbia, S. C.

Following is a list of the new members elected at this meeting:

ACTIVE MEMBERS.

Ivers S. Adams, Boston; Robert Franklin Adams, New York; Edw. E. Bartlett, Augusta, Ga.; Raymond D. Borden, Taunton, Mass.; Jas. C. Eteson, Fitchburg, Mass.; John A. Fernley, New Bedford, Mass.; S. L. Gabriel, Millbury, Mass.; William C. Garner, Newmarket, N. H.; Chas. E. Harrison, Pawtucket, R. I.; William E. Hatch, president New Bedford Textile School; John Kniveton, instructor in weaving and warp preparation, Bradford-Durfee Textile School, Fall River; J. H. Ledyard, Meridian, Miss.; Chas. B. Luther, Fall River; Geo. M. Montgomery, Windsor Locks, Conn.; William Myers, supt. yarn and cloth testing dept. and lecturer on textiles, Technical School, Manchester, England; H. W. Nichols, supt. New Bedford Textile School; W. Frank Shove, Fall River; Fredk. E. Waterman, Fall River.

ASSOCIATE MEMBERS.

Arthur Birch, Arlington, Mass.; L. W. Campbell, Woonsocket, R. I.; Frederick N. Dillon, Fitchburg, Mass.; E. C. Foerster, New York; Meldon H. Merrill, Boston; S. F. B. Morse, New York; Robert Schaellibaum, Providence, R. I.

Those registered as present were:

MEMBERS.

Herbert E. Walmsley, New Bedford, Mass.; C. J. H. Woodbury, Lynn, Mass.; Charles H. Fish, Dover, N. H.; Christopher P. Brooks, New Bedford, Mass.; H. C. Atwood, Killingly, Conn.; Lewis E. Barnes, Pemberton and Methuen, Mass.; Frank A. Bowen, Appleton Company, Lowell, Mass.; Robert Burgess, Pawtucket, R. I.; William H. Cadwell, Jackson Company, Nashua, N. H.; Frank B. Comins, Boston, Mass.; John J. Connell, Tremont and Suffolk Mills, Lowell, Mass.; Henry S. Culver, Westville Cotton Mills, Taunton, Mass.; Charles A. Denny, Leicester, Mass.; John H. Estes, Fall River, Mass.; William Evans, Fall River, Mass.; M. F. Foster, Milford, N. H.; George P. Grant, Jr., Fitchburg, Mass.; Henry F. Harris, Easthampton, Mass.; William D. Hartshorne, Lawrence, Mass.; William B. Hawes, Fall River, Mass.; Edward B. Jennings, Samoset Company, Valley Falls, R. I.; Leonard Johnson, Wampanoag Mills, Fall River, Mass.; Nathaniel B. Kerr, Butler Mill, New Bedford, Mass.; Charles F. Libby, Lowell, Mass.; William L. Lyall, Brighton Mills, Passaic, N. J.; Otis G. Lynch, Enterprise Manufacturing Company, Augusta, Ga.; Frederick B. Macy, New Bedford, Mass.; Charles T. Main, Boston, Mass.; Thomas Mayor, Providence, R. I.; Roscoe S. Milliken, Nashua, N. H.; Albert H. Morton, Kitson Machine Company, Lowell, Mass.; John Neild, New Bedford, Mass.; George E. Prest, Worcester, Mass.; Frederick W. Reynolds, New Bedford, Mass.; J. N. Sanderson, Adams, Mass.; J. C. Smith, Fall River, Mass.; Hon. Rufus A. Soule, New Bedford, Mass.; Henry B. Sprague, Lynn, Mass.; Walter F. Stiles, Orswell Mills, Fitchburg, Mass.; D. A. Tompkins, Charlotte, N. C.; Oscar B. Truesdell, Newtonville, Mass.; Alphonso F. White, Forestdale, R. I.; William S. Whitney, Lawrence, Mass.; Benjamin Wilcox, New Bedford, Mass.; George A. Ayer, Easthampton, Mass.; D. M. Thompson, Providence, R. I.; James P. Tolman, Lamson Cordage Works, Boston, Mass.; Philip Dana, Westbrook, Me.; J. C. Lewis, Salmon Falls, N. H.; R. W. Eaton, Brunswick, Me.; L. M. Cousens, Portland, Me.; William Firth, Brookline, Mass.; Colin C. Bell, Boston, Mass.; F. H. Bishop, Boston, Mass.; Charles B. Burleigh, Boston, Mass.; Charles H. Child, Providence, R. I.; Melvin H. Coffin, Whitinsville, Mass.; C. F. Curwen, Salem, Mass.; Fred. I. Dana, Providence, R. I.; Daniel J. Danker and J. P. Marston, Danker & Marston, Boston, Mass.; G. B. Emmons, Lawrence, Mass.; D. D. Felton, Manchester, N. H.; Vladimir F. Guesin, The Great Yaroslavl Manufacturing Company, Moscow, Russia, New York; Alfred H. Hartley, Fall River, Mass.; Frederick W. Howe, Providence, R. I.; Frank B. Kenney, Lowell, Mass.; John H. Lawrence, New Bedford, Mass.; Stephen C. Lowe, John Hetherington & Sons, Ltd., Boston, Mass.; John McCullough, New

Bedford, Mass.; John R. Mitchell, New York; Charles B. Moore, Boston, Mass.; Sidney B. Paine, Boston, Mass.; Frank W. Reynolds, Boston, Mass.; Lewis T. Shurtleff, New Bedford, Mass.; Harry M. Smith, Providence, R. I.; Jas. Strang, Indian Orchard, Mass.; Rienzi W. Thurston, Fall River, Mass.; Ellison W. Trafford, Fall River, Mass.; Clement A. Wakefield, Saco & Pettee Machine Shops, Biddeford, Me.; W. W. White, Holyoke, Mass.; Fred A. Wilde, Pawtucket, R. I.; Erving Yale Wooley, Boston, Mass.; Harry W. Butterworth, Philadelphia, Pa.; J. C. King, Concord, N. H.; S. M. Green, Springfield, Mass.; H. G. Brinckerhoff, Newton Centre, Mass.; H. P. Garland, Saco, Me.

GUESTS.

Mrs. C. J. H. Woodbury and the Misses Louise, Laura and Alice Woodbury, Lynn, Mass.; Mr. and Mrs. J. W. Anderson, Lowell, Mass.; Mr. and Mrs. T. C. Ashley, Boston, Mass.; Mrs. H. C. Atwood, Killingly, Conn.; H. J. Ballou, Jamaica Plain, Mass.; John M. Barry, Lynn, Mass.; Mr. and Mrs. Warren M. Breed, Lynn, Mass.; Mr. and Mrs. C. A. Bowen, New Bedford, Mass.; Mrs. Frank A. Bowen, Lowell, Mass.; J. A. Bryant, Boston, Mass.; Mr. and Mrs. W. A. Buck, Worcester, Mass.; W. W. Ballaugh, Brookline, Mass.; Mrs. Robert Burgess, Pawtucket, R. I.; F. H. Burt, Newton, Mass.; Mrs. W. H. Cadwell, Nashua, N. H.; Mrs. Clara P. Carter, Lynn, Mass.; Mr. and Mrs. L. W. Campbell, Woonsocket, R. I.; Mrs. John J. Connell, Lowell, Mass.; Mr. and Mrs. J. A. Cooper, Mrs. J. H. Dunn, Lowell, Mass.; Mrs. Wm. Evans, Fall River, Mass.; L. C. Farnsworth, Providence, R. I.; Mr. and Mrs. S. S. Dale, Boston, Mass.; Mr. and Mrs. F. M. Dillon, Fitchburg, Mass.; Miss Bertha Denny, Leicester, Mass.; C. P. Gaither, Boston, Mass.; Mr. and Mrs. W. H. Garner, Newmarket, N. H.; Mrs. Howard Green, Providence, R. I.; Mrs. Nelson A. Hallett, Newton, Mass.; A. L. R. Hambly, Providence, R. I.; Mrs. Henry F. Harris, Worcester, Mass.; Miss E. C. Hartshorne, Lawrence, Mass.; Mrs. William M. Hawes, Fall River, Mass.; Wm. R. Horn, Lowell, Mass.; Mr. and Mrs. D. A. Hurd, North Berwick, Me.; Alfred A. Hunting, Boston, Mass.; Mrs. E. B. Jennings, Valley Falls, R. I.; Mrs. Leonard Johnson, Fall River, Mass.; Richard Johnson, Oldham, Eng.; Mrs. Nathaniel B. and Miss Marion Kerr, New Bedford, Mass.; Mr. and Mrs. Henry G. Kittredge and Miss M. H. Kittredge, Reading, Mass.; Mrs. Charles F. Libby, Lowell, Mass.; Mr. and Mrs. Daniel Lord, North Berwick, Me.; Mr. and Mrs. Charles B. Luther, Fall River, Mass.; Mrs. Frederick B. Macy, New Bedford, Mass.; Mrs. Charles T. Main, Boston, Mass.; Miss A. Mayer and Miss M. Knobloch, Providence, R. I.; Mr. and Mrs. George M. Montgomery, Windsor Locks, Conn.; Mrs. A. H. Morton, Lowell, Mass.; Mr. and Mrs. Frank L. Nagle, Boston, Mass.; Mrs. John Neild, New Bedford, Mass.; Mr. and Mrs. Charles W. Potter, Providence, R. I.; Miss Eleanor Pierce, New Bedford, Mass.; Mr. and Mrs. Amasa Pratt, Mrs. Frederick W. Reynolds, New Bedford, Mass.; Mrs. J. N. Sanderson, Adams, Mass.; J. L. Sanford, Boston, Mass.; Robert Schaellibaum, Providence, R. I.; A. P. Smith, New Bedford, Mass.; J. M. Spencer, Suffield, Conn.; Mrs. J. C. and Miss Lillian K. and Mark T. Smith, Fall River, Mass.; Mrs. Rufus A. Soule, New Bedford, Mass.; Mrs. Henry B. Sprague, Lynn, Mass.; Arthur M. Stone, Worcester, Mass.; W. I. Stimpson, Hopedale, Mass.; Richard C. Tolman, West Newton, Mass.; Miss Grace Tompkins, Charlotte, N. C.; Mrs. Isaac Varney, North Berwick, Me.; Fred E. Waterman, Fall River, Mass.; Mrs. A. F. White, Forestdale, R. I.; Joseph H. Whitman, Lynn, Mass.; Mrs. H. C. Wood, H. Y. Yagi, Japan; Miss F. Burger, Brook-

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lyn, N. Y.; Mrs. F. H. Bishop, Boston, Mass.; Mrs. Charles B. Burleigh, Boston, Mass.; Mrs. Melvin H. Coffin, Whitinsville, Mass.; Mrs. C. F. Curwen, Salem, Mass.; Mrs. D. D. Felton, James B. Felton, Mrs. S. A. Felton, Manchester, N. H.; Mrs. Frederic W. Howe, Providence, R. I.; Mrs. Frank B. Kenney, Lowell, Mass.; Mrs. John H. Lawrence, New Bedford, Mass.; Mrs. Stephen C. Lowe, Boston, Mass.; Miss Alice McCullough, New Bedford, Mass.; Mrs. Harry M. Smith, Providence, R. I.; Mrs. Rienzi W. Thurston, Mrs. Allison W. Trafford and Miss Inez Trafford, Fall River, Mass.; Mrs. C. A. Wakefield, Biddeford, Me.; Mrs. W. W. White, Worcester, Mass.; Mrs. Fred. A. and Miss Margaret T. Wilde, Pawtucket, R. I.; Henry J. Hosmer, Concord, N. H.; E. S. Merrow, Providence, R. I.; R. E. Wattles and A. S. Wattles, Canton, Mass.; Mrs. William Firth and Miss Firth, Brookline, Mass.; Mrs. H. P. Garland, Saco, Me.; Mrs. S. M. Green, Springfield, Mass.; Mrs. H. G. Brinkerhoff, Newton Center, Mass.; Mrs. R. W. Eaton, Brunswick, Me.; Mrs. L. M. Cousens, Portland, Me.; Mrs. Geo. A. Ayer, Easthampton, Mass.

The Association is to be congratulated upon the success of this semi-annual meeting. The transportation arrangements were excellent and carried out to the satisfaction of all. Particular credit is due to the management of the Mount Washington House, where everything was done to contribute to the comfort of those present. The weather was nearly all that could be desired and it seemed as if the mountain scenery was never grander or more beautiful.

WHY TEXTILE GOODS SHOULD BE ADVERTISED.

This is the eighth of a series of papers upon textile advertising by Thomas Balmer, advertising manager of the three publications of the Butterick Publishing Company—The Delineator, The Designer and the New Idea.

1. Necessity and possibilities of textile advertising.
2. Naming and trade-marking textile goods.
3. Planning the advertising campaign.
4. General publicity and work upon dealers.
5. Actual experience of manufacturers whose advertising has been successful.
6. Brief comment upon six different lines which will then be discussed, one at a time, in the six following papers based upon actual statistics collected at an expense of thousands of dollars and an equal value for the time demanded for their collection.

VIII.

Silk is a higher grade of goods than cottons, is bought by fewer people, represents more money, is sold to a more critical class of customers, is the object of more persistent shopping, and necessarily shows a less volume of business in a given store than cotton.

Silk is a gift of the orient to the occident, and it comes to us treated with all an oriental's tricks. After the heathen Chinese have got through with it, the manufacturer sometimes finds that he has paid a good deal more for the actual silk than he ought to, because the heathen Chinese, with a smile that is child-like and bland, has boiled his raw silk in rice gum, and then sold the silk by weight. The dyer boils out the gum, and while he has the actual length of silk bought, it is considerably less in weight. Sometimes the manufacturer makes good on this by loading the silk with dye so as to increase its weight very materially. This mineral dye produces a silk which is heavy to the touch, but which crocks, fades, splits or runs.

Hence the suspicion with which the average buyer purchases silk.

What this country needs is a silk education.

To tell the truth, silk is an expensive material, and good silk is worth all it costs. The manufacturer who makes a good silk should see that the public understands silk facts. The more intelligent the public is upon the silk question, the better it is for every legitimate, honest, straightforward manufacturer.

To begin with, silk is a luxury. It is the third of the three great textiles with which human beings are clothed, the first being cotton, the second being wool. Silk represents costliness in dress.

Nowadays everything is called silk which is in any way related to silk, and there are hosts of imitations in the way of mercerized goods, all of which tend to confuse the customer's mind as to what real silk is and what it costs.

A careful investigation of the silk department of a large number of leading stores has revealed a certain number of facts which are of special importance to the silk manufacturer who may, might, could, should or would advertise.

Ten prominent department stores were selected, representing different grades—high-priced stores and cheap stores, department stores and dry goods stores.

The first ten customers on a given day who

inquired for silk at the silk department were taken as a basis so as to get a fair average. In regard to each of these ten customers it was noted down:

What she asked for,
For what purpose,
Why she asked for that particular silk,
What the sales girl sold her,
Why she sold that particular brand, and
In case she did not sell, why?

This gave one hundred customers as a basis.

Out of that one hundred customers it will be noted that sixty-eight customers bought, and thirty-two did not buy; that fifteen received what they asked for; eighteen received another kind of silk in place of that for which they asked, and thirty-five who did not specify any brand of silk were sold.

Six different brands of silk were asked for by name, and two customers asked for a guaranteed silk, showing the importance of the guarantee. Of those who asked for silk by name, eight mentioned Lyons' taffeta and were sold it, and three were sold Lyons' taffeta who did not ask for it, but in no other case was a named brand sold when not asked for.

These results point conclusively to the fact that as far as the customer had any name to go by, she used that name, and that in the case of the name used most, the most sales were made, and in addition, this same silk was recommended when no silk was specified.

Unspecified silk was asked for by seventy-five per cent. of the shoppers. For one thing, this is a far greater proportion than is true of cotton goods, showing that a greater ignorance exists in the minds of shoppers in regard to the names of silks than in regard to the names of cottons.

Three-fourths of the shoppers, it may be safely said, have no silk definitely in mind when they go to buy silk. It is hard to believe that out of this same class of women who are buying for their homes or themselves, there would be seventy-five per cent. who had not heard of Uneeda Biscuit, Ivory Soap, Royal Baking Powder, Ostermoor Mattresses, Sapolio or a dozen other well-known articles.

This means that any manufacturer making a really good silk at a reasonable price has a fair chance of interesting seventy-five per cent. of the shoppers who now have no definite notions about silk. If a manufacturer were assured the demand of three-fourths of the people who buy silks, he would certainly offer pretty good inducements to get it, and yet, as the situation stands today, some manufacturer who will look at his problem largely enough to take space in proportion to his importance, has the greatest opportunity of interesting and convincing three-fourths of the women who wear silk.

The average of these inquiries shows that the buyers do not want a high-priced silk. Some of them asked for taffeta, and most of them wanted it for the secondary uses of silk, such as petticoats, waists and bathing suits, and thirty-two per cent. for silk dresses. This means an average price silk.

Now there are a large number of silks manufactured which are excellent for the price. The manufacturer knows they are good, the jobber and the retailer know about them, but as far as the consumer is concerned, they are just so much silk, so she goes into the silk department of her dry goods store and asks for a silk or a taffeta, and takes the chances of the salesgirl's knowing what to give her, of getting just what she wants, and of getting a silk which is guaranteed, trade-marked and pushed by the manufacturer because he is proud of the silk he makes.

If you will turn to the tables which follow this article, you will see the whole net result of this investigation laid out in black and white.

These tables show that the purposes for which silk was asked,

31 did not say,
32 wanted it for dresses,
12 for petticoats,
6 for coats,
3 for wrappers,
1 for ball-gown,
3 for shirtwaists,
1 for dust coat,
3 for bathing suits,
3 for lining,
3 for fancy work,
1 for cover for sofa cushion,

1 for night-gown.

100

48 did not say why they asked for it,
2 wanted style,
5 wanted something that would not wrinkle or crack,
1 to shed dust,
1 something that cut to good advantage,
5 wished to match something,
15 had bought the silk before and found it satisfactory,
2 were looking for light, cool silks,
1 wanted to paint on it,
2 were looking for quality,
7 for washability,
1 for bathing suit,
1 wanted the rustle,
2 wanted something wide,
1 wanted something that would hang gracefully,
3 wanted something pretty,
2 wanted something durable,
1 wanted stiffness.

100

None of them wanted the silk for which they asked because they had seen it advertised, but if any one silk had been advertised as a silk should be advertised, the majority would have asked for the silk which had been so advertised, and the majority of reasons would have been because such silk had been advertised, or because the claims made for it in the advertising were believed to be true.

In the next section of the table you will find that while fifteen were sold what they asked for, thirty-five were sold the store's own particular brand.

The table shows also that three were sold domestic silks and three imported. This, of course, simply means those who were sold under these names, because all of the silks mentioned were either domestic or imported.

Finally it is to be noticed that of the silks which were sold,

7 were sold because the sales girl knew they were good.

8 because the silk was guaranteed,

15 because the customer wanted it, which means nothing, except that in the majority of cases the customer got what she wanted, which is another strong suggestion to the advertiser.

Among the other reasons given for selling the brand sold are,

2 best for money,
1 knew the brand,
2 widest for the money,
7 price satisfactory,
1 strong,
4 wears well,
3 matched samples,
1 stiff,
2 color fast,
1 correct weight,
1 soft,
1 best made.

It is to be borne in mind that these opinions as to quality are the opinions of the sales girl and the reasons she gave to the customers which satisfied them. On the other hand, most of these reasons were given in favor of the house's own silk, which, of course, the silk department has instructions to push where possible.

It should also be noticed that either the sales girl or the customer was so little familiar with the name of Bonnett Silk that it was pronounced "Bunny," and was so entered upon the sheet, which, among other things, proves that the silk was only known by hearsay and had never been seen in print as regular advertising.

The net result of this investigation in its lesson for advertisers is as follows:

1. Shoppers are more at sea about silks than almost any other textiles.

2. Three-fourths of the silk shoppers have no definite brand in mind.

3. A store is able to push its own particular brand of silk to the disadvantage of other silks.

4. Neither the shopper nor the sales girl knows any too much about silks.

5. The oldest and best known brand easily led in advantage, which is merely an inkling of what could be done with advertising.

6. There is a chance for one, or two, or three or more live silk manufacturers to utilize this great silk market which has never been touched by advertising.

THOMAS BALMER.

SILK.

1. WHAT SHE ASKED FOR.	No. of customers	2. For what purpose?															3. Why she asked for it?																
		Did not say	Dress	Petticoat	Coat	Wrapper	Ball Gown	Shirtwaist	Dust Coat	Bathing Costume	Lining	Fancy Work	Cover for a Sofa Cushion	Night Gown	TOTAL		Did not say	Style	Would not Wrinkle or crack	To shed dust	Cuts to good advantage	To match	Last purchase satisfactory	Light and cool.	To paint on	Quality	Washable	Suitable for bathing costume	Bustles	Wanted it wide	Hangs gracefully	Pretty	Wanted something durable	Stiffness	TOTAL
Lyons Taffeta	8	4	4	1	..	1	..	..	..	..	..	..	..	..	8		8	..	..	..	..	..	5	..	..	1	..	..	..	..	..	..	..	8
*Bunny "	2	..	2	..	..	..	..	..	..	..	..	..	..	..	2		..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	2
Stirling "	2	1	..	..	..	..	..	..	..	1	..	..	..	..	2		1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2
†"Moneyback" Taffeta	2	1	1	..	..	..	..	..	..	..	..	..	..	..	2		..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	2
Gilt Edge "	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1		..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1
Soft Fin. "	1	..	1	..	..	..	..	..	..	..	..	..	..	..	1		1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Unspecified "	75	25	20	11	6	2	1	2	1	2	3	1	1	..	75		42	..	..	5	1	1	5	6	..	1	4	3	..	1	2	2	..	2	1	75
China Silk	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1		..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	1
Chiffon "	2	..	2	..	..	..	..	..	..	..	..	..	..	..	2		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	2
Surah "	2	..	..	..	..	..	..	..	..	..	..	2	..	..	2		1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2
Habutin Silk	2	1	..	..	..	..	..	1	..	..	..	..	..	..	2		1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Unspecified Silk	1	..	1	..	..	..	..	..	..	..	..	..	..	..	1		..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Liberty Satin	1	..	1	..	..	..	..	..	..	..	..	..	..	..	1		1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
TOTAL	100	31	32	12	6	3	1	3	1	3	3	3	1	1	100		48	2	5	1	1	5	15	2	1	2	7	1	1	1	3	2	1	100

1. What She Asked For.—Continued.	4. What did you sell her?												5.	6. Why did you not sell?									
	Own make	Same as she asked for	Domestic	Imported	Lyons	Lyons dull finished	Imperial Swiss	Satin foulard	Wash silk	"Guaranteed" silk	Nothing	TOTAL	For detailed analysis see following page.	Did not say	Color did not suit	Too expensive	Did not have what she wanted	Wanted to look elsewhere	Did not like pattern	Not wide enough	Too rough	Did not have enough money	TOTAL NO. WHO DID NOT BUY
Lyons Taffeta	..	8	..	..	..	..	..	..	..	..	..	8		..	..	..	..	..	..	..	..	..	..
*Bunny "	..	2	..	..	..	..	..	..	..	..	..	2		..	..	..	..	..	..	..	..	..	..
Stirling "	..	1	..	..	..	..	..	..	..	..	1	2		..	..	..	1	..	..	..	..	..	1
†"Moneyback" Taffeta	..	2	..	..	..	..	..	..	..	..	..	2		..	..	..	..	..	..	..	..	..	..
Gilt Edge "	..	1	..	..	..	..	..	..	..	..	..	1		..	..	..	..	..	..	..	..	..	..
Soft Fin. "	..	..	..	..	..	1	..	..	..	..	..	1		..	..	..	..	..	..	..	..	..	..
Unspecified "	35	..	3	1	3	..	2	..	1	2	28	75		10	4	7	..	2	3	..	1	1	28
China Silk	..	..	..	1	..	..	..	..	..	..	..	1		..	..	..	..	..	..	..	..	..	..
Chiffon Silk	..	..	..	..	2	..	..	..	..	..	..	2		..	..	..	..	..	..	..	..	..	..
Surah "	..	..	..	1	..	..	..	..	..	..	1	2		1	..	..	..	..	..	..	..	..	1
Habutin Silk	..	1	..	..	..	..	..	..	..	..	1	2		..	..	..	..	..	..	1	..	..	1
Unspecified Silk	..	..	..	..	..	..	..	1	..	..	..	1		..	..	..	..	..	..	..	..	..	..
Liberty Satin	..	..	..	..	..	..	..	..	..	..	1	1		..	..	1	..	..	..	..	..	..	1
TOTAL	35	15	3	3	5	1	2	1	1	2	32	100		11	4	8	1	2	3	1	1	1	32

*Correct spelling is "Bonnett."
†Correct spelling is "Moneybak."

4. WHAT DID YOU SELL HER? (Repeated, see foregoing page.)		5. Why did you sell it?																						
		Did not say	Know it is good	It is guaranteed	Color pleased her	She wanted it	Best for money	Knew the brand	Widest for money	Material suited	Price suited	Strong	Wears well	Matched sample	Stiffness	Fast colors	Last purchase was satisfactory	Correct weight	Soft	Best made	.....	TOTAL	TOTAL
OWN MAKE.	Unspecified taffeta,	....	6	8	1	....	2	....	....	3	5	....	3	1	1	1	1	1	....	....	....	—	35
SAME AS SHE ASKED FOR.	Lyon's "	....	....	....	....	12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	15
	Bunny "	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	
	Stirling "	....	....	....	....	—	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	
	"Moneyback" "	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	
	Gilt Edge "	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	
	Habutin "	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	
DOM.	Unspecified "	....	1	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	—	3
IMPORTED.	Unspecified "	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	3
	China Silk	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	
	Surah "	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	
LYON'S.	Unspecified taffeta,	1	....	....	....	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	2	5
	Chiffon silk	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	2	
Lyon's dull fin. taffeta		....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	—	1
Imperial Swiss "		....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	—	2
Satin foulard		....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	—	1
Wash silk		....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	—	1
"Guaranteed" silk		....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	—	2
NOTHING.		....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	—	32
TOTAL		1	7	8	2	15	2	1	2	8	7	1	4	3	1	2	1	1	1	1	32	—	100

SUMMARY.

MATERIAL.	Lyon's taffeta	Lyon's dull fin. taffeta	Lyon's silk	Bunny taffeta	Stirling taffeta	"Moneyback" taffeta	Gilt Edge taffeta	Habutin taffeta	Unspecified taffeta	Domestic taffeta	Imported taffeta	Imported China silk	Imported Surah silk	Imperial Swiss taffeta	Satin foulard	Wash silk	"Guaranteed" silk	TOTAL NO. OF SALES
Sold when asked for	8	....	....	2	1	2	1	1	35	....	....	....	....	....	....	....	....	50
Sold when not asked for	3	1	2	....	....	....	....	....	....	3	1	1	1	2	1	1	2	18
TOTAL	11	1	2	2	1	2	1	1	35	3	1	1	1	2	1	1	2	68

Number of customers who bought	68
Number of customers who did not buy	32
TOTAL NUMBER OF CUSTOMERS	100

TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

OUR TEXTILE DESIGN SCHOOL.

LESSON 9. SEVENTY-FIVE DEGREE STEEP TWILLS.

These steep twills or diagonals have for their foundation the common, or 45° twills, and are more particularly designed for the manufacture of ladies' fancy dress goods, although some of the plainer effects, may, with advantage, be used in the manufacture of worsted suitings and coatings, as well as in combination with other weaves in connection with worsted trouserings.

In order to show the student the construction of these weaves more in detail, diagrams 1, 2 and 3 are given, and of which

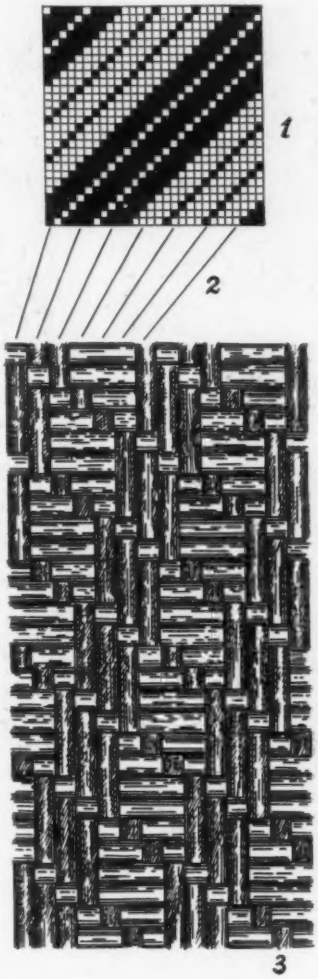
Diagram 1 shows one repeat of the $\frac{4}{1}\frac{1}{4}\frac{1}{4}\frac{4}{1}\frac{4}{1}\frac{1}{4}$ 28 harness common, or 45°, twill.

Diagram 2 shows the drafting required to produce the 75° steep twill from the above 45° twill, using every fourth warp thread of said common twill only in the construction of the new steep twill, i. e., use one warp thread and miss three warp threads of the regular twill. This drafting in connection with the regular twill quoted in our example will on account of $(28 \div 4 = 7)$ result in the 75° steep twill, as shown in diagram 3, repeating on 7×28.

This method of drafting 75° twills from regular twills will result in that:

16-harness 45° twills will produce 4-harness, i. e., 4×16 steep twills; 20-harness 45° twills will produce 5-harness, i. e., 5×20 steep twills: 24-harness 45° twills will produce 6-harness, i. e., 6×24 steep twills, etc., etc., in short any 45° twill, whose repeat is evenly divisible by 4 will reduce the harnesses to one-fourth its number for the 75° twill.

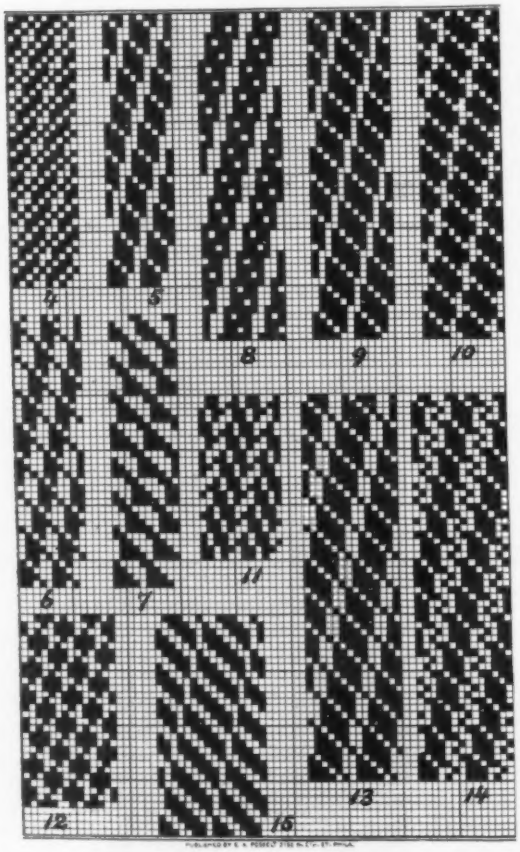
This will also indicate to the student that a 14-harness 45° twill will result in a 7-harness, i. e., 3×12 steep twill; 18-harness 45° twill will result in a 9-harness, i. e., 9×18 steep twill; 22-harness 45° twill will result in a 11-harness, i. e., 11×22 steep twill; 26-harness 45° twill will result in a 13-harness, i. e., 13×26 steep twill; 30-harness 45° twill will result in a 15-harness, i. e., 15×30 steep twill, etc.,



etc., the affair again resulting in the *rule*, that any 45° twill whose repeat is evenly divisible by 2 will reduce the number of harnesses required for the 75° steep twill as obtained from it, to one-half.

From this we will see that any common twill whose repeat is neither divisible by 2 nor 4, i. e., common twills repeating on an uneven number of harnesses will not reduce the number of harnesses required for the 75° steep twill, compared to that of the common twill. By this we mean that, for example, a

13-harness 45° twill will result in a 13-harness, i. e., 13 × 52 steep twill; 15-harness 45° twill will result is a 15-harness, i. e., 15 × 60



steep twill; 17-harness 45° twill will result in a 17-harness, i. e., 17 × 68 steep twill; 19-harness 45° twill will result in a 19-harness, i. e., 19 × 76 steep twill, etc., etc.

Having thus given a thorough explanation of the construction of these steep twills, we will in turn shop up a few practical examples, practical weaves, for the reason to push the student more particularly to study the construction of these weaves, as well as to give the designer or manufacturer his benefit of the lesson, i. e., give him a collection of some of the best, if not the best, 75° twills possible to be constructed, on hand, for ready use any time he is in need of them; in fact it is an object of all our lessons to produce nothing but practical tested weaves, weaves taken from fabrics, weaves which have been used, and will remain in use, and in this manner give the manufacturer, by means of these lessons, an unlimited variety of good weaves at his disposal.

Weave Fig. 4 shows us a neat 5-harness 75° twill or diagonal, and which in itself is well adapted for the manufacture of dress goods as well as men's wear, the result being a well broken up effect, which only will shop up the steep twill effect when examining the fabric over the perch or when made up in the garment. It certainly will produce a neat effect, a weave which can be used with success in every season's designs, in connection with dress goods, and where the steep twill effect, especially, will show up well. The foundation weave, as will be readily understood by the student is the $^{2}_{1}{}^{1}_{2}{}^{1}_{2}{}^{1}_{1}{}^{2}_{1}{}^{2}_{1}{}^{2}_{1}$ 20-harness 45° twill.

Weave Fig. 5 is a steep twill repeating on the same number of harnesses, i. e., 5-harnesses, but showing a more pronounced diagonal effect, somewhat of a heavy oblique rib line, *cord*, and is obtained from $^{1}_{6}{}^{1}_{1}{}^{1}_{1}$ 20-harness regular twill.

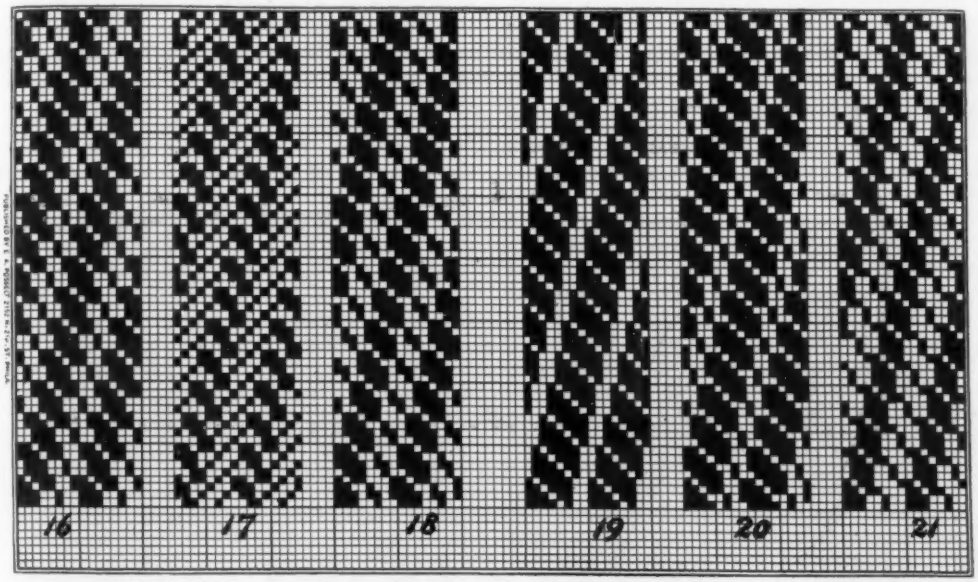
Diagrams Figs. 6 and 7, are similar 5-harness 75° steep twills, as obtained from their respective 20-harness common twills, and will need no further comment for that reason.

Weaves Figs. 8, 9, 10 and 11, are 75° steep twills obtained respectively from their 24-harness common twills; the diagonals repeating on 6 × 24. Each and every one of these four diagonals is a good weave, especially weaves Figs. 9 and 10.

Weaves Figs. 12, 13 and 14—each weave repeating on 7 × 28, has for its foundation its respective 28-harness regular twill, the diagonal, however, only requiring 7-harnesses for its execution on the loom.

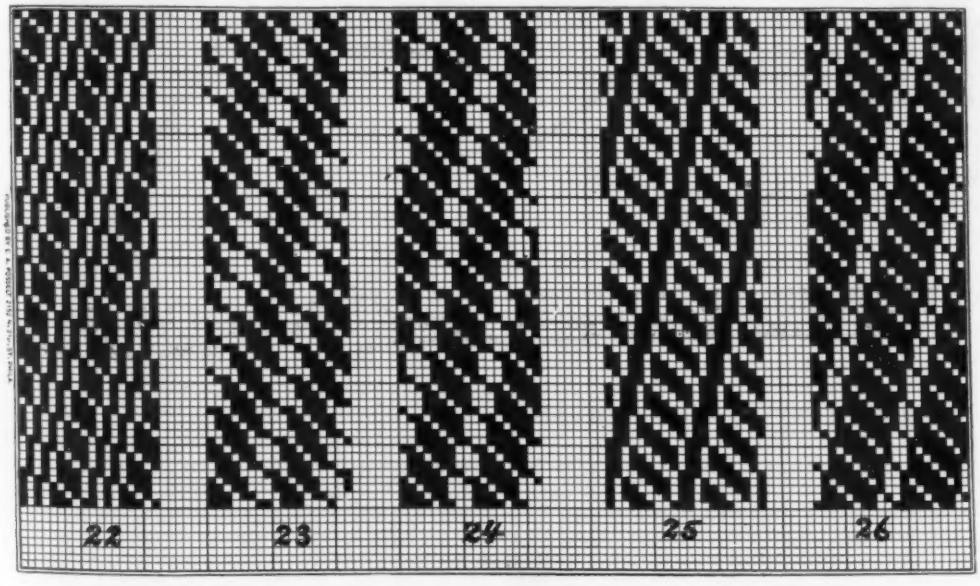
Weaves Figs. 15, 16, 17, 18, 19, 20 and 21 show a collection of seven excellent 75° diagonals, each of them repeating on 8 × 32; each

one of them being constructed, i. e., having for its foundation its respective 32 × 32 regular



twill, the diagonal requiring for its execution 8-harnesses, for the fact that 32 (repeat of common twill) ÷ 4 (drafting) = 8 (number of harnesses required for diagonal).

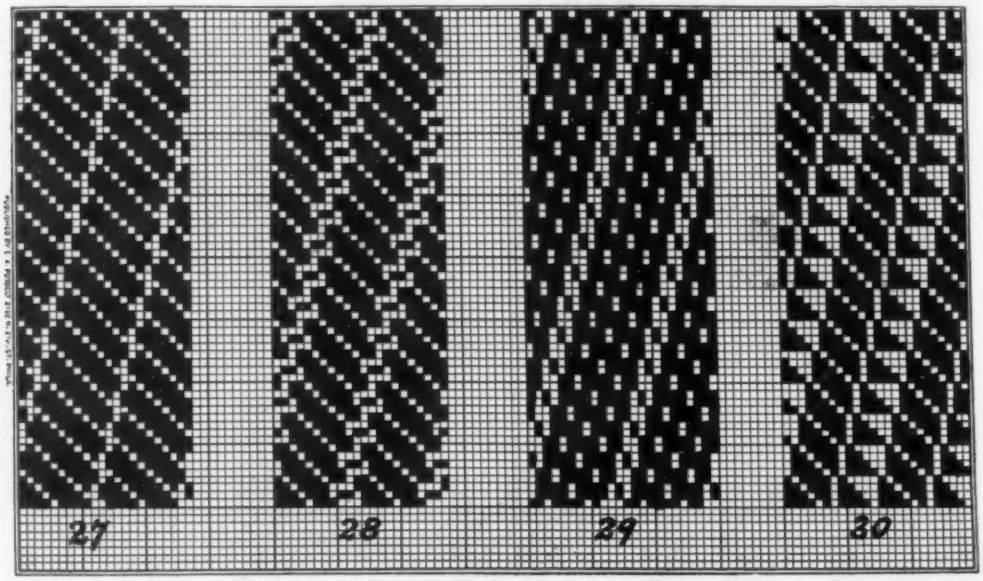
Weaves Figs. 22, 23 and 24 are 75° steep twills, designed for 9-harness repeat, being constructed from their respective 36 × 36 common twills, the new diagonal repeating on 9 × 36.



In the same manner weaves Figs. 25 and 26 as repeating on 10 × 40 are designed from their

respective 40 × 40 regular twills, the diagonal calling for 10-harnesses as compared to the 40-harness, required for the execution of the common twill.

Weaves Figs. 27 and 28 show two examples of 11-harness diagonals, constructed from their respective 44-harness regular twills, the diagonals requiring for their execution on the loom 11-harnesses × 44 picks, in repeat of pattern.



Weaves Figs. 29 and 30 in turn show 75° diagonals for 12-harnesses, designed from their respective 48-harness regular twills. The repeat of the diagonal is 12 × 48.

LESSON.

Construct one new 75° diagonal *each*, for 8, 9, 10, 11, 12, 13, 14, 15 and 16 harness repeat.

AN IMPROVEMENT TO WOOL COMBERS.

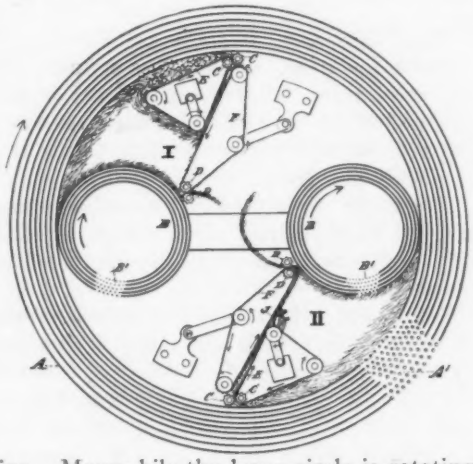
The object of this machine, as will be readily understood, is to comb out or separate the long and medium fibres from all adhering lumps, dirt, short or broken fibres, etc., and deliver said good fibres from the machine, in the form of a sliver.

The object of the improvement is to prevent any tendency of the combed fibres to return upon themselves or overlap, during the delivery from the combing mechanism, by providing a guide for the fibres composing the wool slivers so that they will pass along their appropriate traveling aprons to a suitable funnel and into the roving cans for receiving them. In order to explain the improvement, it will be necessary to describe the principle of operation of the wool comb, both of which are best done by means of the accompanying illustration, which is the top view of sufficient portions of a wool comber to show the principle of operation and the improvement to the machine.

Referring to the illustration, the large circle A and the smaller circles B comprise vertical rows of pins A and B respectively, constituting, broadly, the combs, and said pins vary in size and number according to the quality of wool to be combed, the three circles revolving in the same direction about their respective axes. The smaller circles of pins are located so that their periphery at one point is always adjacent to the large circle, all circles revolving with the same peripheral speed, which thus combs the wool previously brought to the meeting point of the large and smaller circles as it constantly feeds through the "boxes" surrounding the large circle. A

"dabbing-brush" presses the wool down upon the pins of the large and a small circle at the point of meeting, and thus by having the wool partly caught by the teeth in each circle, permits the small circles to draw off the short wool from the larger circle, the longer projecting fibres of wool being retained there, while the shorter projecting fibres remain in the smaller circles, the wool being thus combed clear, leaving the "noil" in the pins of the circles.

Vertically placed drawing-off rolls D now catch the protruding fibres of wool from the small circles B respectively, combing as they draw the end of the fibre previously in the



pins. Meanwhile the large circle is rotating, with its long fibres projecting, until they meet with a traveling apron E which respectively pass around one of a pair of drawing-off rolls C which carry along such fibres as they catch and pass them on until they meet with a second traveling apron F respectively, bearing the short fibre from the smaller circles. Thus the ends of short and long fibres unite to form the "combed top" and are conveyed through a suitable funnel and deposited into their several receptacles.

In the practical operation of the comber as thus outlined, the long fibres of wool have more or less a tendency to separate after their union with the short fibres and in consequence overlap and constantly accumulate in bulk upon the outside aprons E as they travel towards the larger circle, increasing until they interfere with the pins in the circle, causing breakage and becoming a serious obstacle to the proper combing of the wool on the pins, thus preventing the legitimate functions of the machine. Such an accumulation of wool fibre is illustrated in one arrangement marked I.

To obviate this difficulty, the improved device, comprising a "sliver-conductor" J, is secured near the union of the outside and inside aprons E and F, in a manner to direct the sliver of wool properly along the inside apron F, and effectually prevents the objectionable overlapping and consequent conveyance of the sliver back again to the beard coming from the large circle, a feature shown in connection with arrangement II in illustration.

It will be readily understood that each one of the two delivering mechanisms is provided with a conductor, although only one was mentioned in the explanation.

By means of the improvement it is claimed that no constant supervision is necessary to obviate the tendency of the wool slivers to deviate from their proper course, during the process of combing, as has been explained.

A NOVEL SHEARING ARRANGEMENT FOR CLOTH SHEARING MACHINES.

The most vital part of a shear is the cutting or shearing arrangement, since at this point the cloth can be practically ruined by any defect in the construction or setting of the machine.

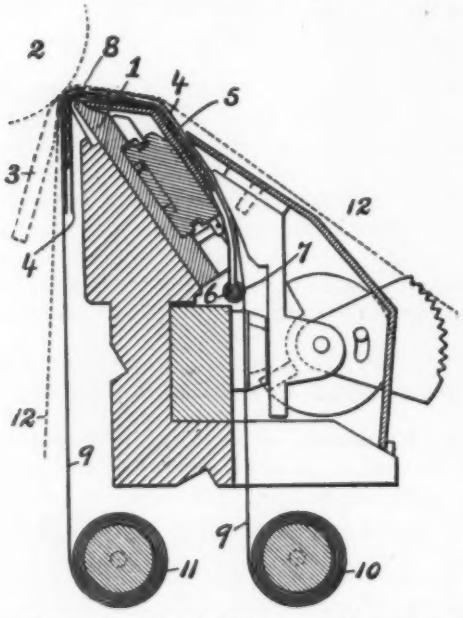
In cloth-shearing machines of the steel rest type, the cloth to be sheared is supported on the rounded edge of the cloth-rest and is operated on by the revolving cylinder blades.

The object of the shearing operation is to shear the raised nap of the cloth under operation, and produce a uniform, even surface. The cloth is under tension as it passes over the cloth-rest, and any local irregularity in the cloth, such as a knot on the back of the fabric, will bring the surface of the cloth at this particular point closer to the shearing-blades and cause the nap to be cut closer than at other parts on the surface of the cloth. It has been found, however, that with a cushion formed of felted fibre, in this instance, interposed between the cloth-rest and the cloth,

knots and other imperfections in the weave will cause the cushion to yield locally, so that an even surface of the cloth is maintained and the nap is shorn evenly.

The application of a felt cushion to a steel cloth rest is best shown by means of the accompanying illustration, which is a cross sectional view through the cloth rest, also showing the passage of the cloth to be sheared, through the shearing arrangement.

Referring to the illustration, 1 indicates the cloth rest, 2 is the shear cylinder, and 3 is the ledger blade. The felt cushion is made up of a folded sheet of cotton cloth 4, made to form



an apron, the felt 5 being secured between the two pieces of the cotton cloth. The fold of the cotton cloth is secured to a rod 6 by means of a clamp 7.

This apron extends from the rod 6 over the cloth rest and around the nose 8 of the same, being held in position by a sheet of smoothly finished silesia cloth 9 extending from the roll 10 over the apron to the roll 11, the object of the cloth being to give as smooth a passageway for the cloth under operation as possible.

The felt used is made of short fibre, and of such thickness as will best support cloth of the weight required to be sheared. The felt may be made of any desired density, so as to form a more or less yielding cushion. With the felt cushion all knots or imperfections on the back of the cloth 12 depress the cushion locally, because the fibres of the felt yield laterally and support the cloth close up to the knot or imperfection, thereby insuring the even cutting of the nap and uniform finish of the cloth.

THE MANUFACTURE OF SILK FROM FIBRE TO FABRIC.

ARTICLE III.

BOILING OFF.

The hard silk, as it is called, when it reaches the dyer, contains the natural gum and color from the worm, and other impurities, and which have all to be discharged from the silk, more or less, according to the class of silk desired by the trade.

There are three principal varieties of such scoured silks, known respectively as boiled off or soft silk, in which all the gum, etc., has been removed.

Souple silk, which has been so treated that only a portion (about one-sixth) of the gum has been removed; and

Ecru silk, which has been subjected to such gentle treatment in boiling off, that only about one-twelfth of the gum has been removed.

Boiled off silk or soft silk in its completed state is prepared by several processes, each of which consists of a number of operations, which have for their object the complete removal of the gum and coloring matter of the silk. The complete process for ordinary boiled off silk is carried out usually in about three operations known as,

(1) Stripping, or ungumming; (2) boiling off; (3) bleaching.

STRIPPING.

In this operation the great bulk of the gum is removed, and with it most, if not all, of the coloring matter present, which is always found in the gum rather than in the true fibre. The operation is known in this country as "ungumming."

In all of the operations, it is of the greatest

importance that only soft water should be used. If only hard water is available, i. e., water containing lime or magnesium salts, it must be first softened with carbonate of soda, of better with ammonia, which does not give the bath a permanent alkaline reaction. If, too, the silk is to be dyed of a light shade, it is essential that the soap used should be of the best quality of olive or cocoanut-oil soap, and be absolutely without color. In treating weighted silk, the metallic oxides must be first of all removed with hydrochloric acid, which is diluted with an equal volume of water. This treatment also facilitates the subsequent soaping by removing dirt and portions of the gum.

The stripping operation is generally carried on in rectangular wooden vats, measuring 10 feet by 3, with a depth of 3 feet. Such a vat will accommodate about 80 lbs. of silk and is built with a steam pipe running around the bottom, which serves to heat the solution in the vat. The skeins of silk are hung in this vat from wooden rods resting on the sides. If only small quantities of silk are to be treated, proportionately smaller vats may be used. In some works the vats are made of iron or of copper, but wood offers less risk of metallic stains, which, when gotten on the silk are not easily taken out. Sufficient water is used in the vat to allow the skeins to hang freely, it being best not to use less than 3 gallons to 10 lbs. silk, but more, if possible; 3 lbs. of good olive oil soap are dissolved in it for every 10 lbs. of silk; and the temperature of the bath is raised to about 190 deg. to 195 deg. F. The silk is immersed and worked in the bath from half an hour to an hour, during which time the heat may be raised to 203 deg. or 205 deg. F. At first the silk swells up and becomes sticky, but after it has been in the bath about five minutes the gum begins to dissolve, and leaves the fibre glossy. At the end of the operation the hanks are taken out, squeezed, and then rinsed in water containing about 1/4 lb. soap and 2 oz. soda to the gallon.

If the silk is required to be very white, or is being prepared for dyeing light shades, then it is desirable and even necessary to use two or even three soap baths. The first soap bath then contains 2 1/2 lbs. of soap for every 10 lbs. of silk, and is used as just explained. The second bath contains 1 1/2 lbs. of soap for every 10 lbs. of silk. The third bath, when used, may contain only 1 lb. of soap to 10 lbs. of silk. This last soap bath may, by adding 1/2 lb. more soap, be used again as the second soap bath for a new lot of silk, and similarly the addition of 1 lb. more soap to the second bath, renders it suitable for a new batch of silk. This plan of working the various baths over, not only leads to better results, but economizes in soap. Experience is required for properly carrying out of this work, and it is in such cases, where the material operated on is variable in character, that the practical man is enabled by his experience to stop the process when the desired effect has been obtained, for which no solid rules can be laid down. The treatment in the soap bath should continue only long enough to get the gum off; because if further prolonged, the fibroin will begin to take up more or less color from the bath, which is difficult to remove afterwards.

As mentioned before, the water should be soft, because if it is at all calcareous, a quantity of insoluble lime soap will form in the bath, and if this is thrown down on the silk, will interfere with its proper stripping.

Silk which has been weighted in the gum gives a great deal of trouble in the stripping bath, as the metallic bodies, with which it has been weighted, combine with the soap and form insoluble soaps, which are deposited on the silk, causing it to be tarnished and sticky, and making the ungumming operation extremely difficult, if not impossible. These weighted silks should first be treated by rinsing in water, than soaking in a warm bath of dilute hydrochloric acid at 100 deg. to 120 deg. F.—one part of acid to one of water—which will as a rule remove the great bulk of the weighty matter. After steeping in the acid for about two hours, the silk is taken out and rinsed in clean water, after which it is ready for the stripping baths.

The soap baths after being used are known as "boiled off liquor," and are kept for use in dyeing silk.

Boiled off liquor is usually of a faint brownish color, has a specific gravity of about 1.010 to 1.006 and contains from 1,250 to

1,300 grains of solid matter per gallon of liquor, of which some 900 to 950 grains are soap.

BOILING OFF.

After the stripping is completed, the next operation is the boiling off. The stripped silk is put into bags made of hemp or flax, which are generally known as "pockets" by silk dyers, and these are put into boiling vats or kettles, constructed of copper or other suitable material, and boiled for half an hour with 10 per cent. of soap, after which the silk is well washed with clean water.

It is not absolutely necessary to put the silk into bags, and very often it is hung on wooden rods in the soaping vat. The soap liquors left in the vats can be used to strip a fresh lot of raw silk, thus saving soap, and afterwards used as "boiled off" liquors for dyeing.

The quality of the soap used for the boiling off is of some importance, the same as with stripping, and care must be exercised in selecting it. Olive oil and cocoanut oil soaps can be recommended for this purpose also, and the latter can be used with hard water, as it is much more soluble in water than any other kind of soap; but it frequently contains a quantity of water, which it is not easy to detect from the outward appearance of the soap. Castor oil soap is also very soluble, and is a good cleanser, but the odor of the oil is apt to be too persistent for it is to be used for white or pale tints. Good white tallow soap is excellent for this purpose. For black and dark colors, such as brown, etc., where the silk passes through many baths, the poorer qualities of soap will do equally well, as any unpleasant odor disappears during the process of dyeing, as well as any color the soap may impart to the silk. Soaps made from oleic acid, palm oil or poor tallow, can be used for dark colors.

BLEACHING.

If the silk is to remain white, or to be dyed in light tints, it has to be bleached after passing through the boiling off baths. There are several different methods of bleaching, one of the most important being by the use of sulphur.

BLEACHING BY SULPHUR.

The process consists in subjecting the silk to the action of sulphur gases. The silk is hung in closed chambers, so that it can be stoved with the sulphur. The best arrangement is to have these chambers divided into two compartments by a perforated false bottom, the skeins of silk being hung on wooden rods, in the upper chamber, while the sulphur is burnt in the bottom compartment. After the chamber has been filled sufficiently with silk, the doors are closed, and a quantity of sulphur placed in an iron pan and burnt under the perforated plate, generally 1 lb. of sulphur being allowed for from 25 to 30 lbs. of silk.

The silk is allowed to hang in the chamber for from 4 to 6 hours, when it is taken out, and well rinsed in water. If the silk is not sufficiently white after this treatment, the stoving is repeated. Stoving with sulpher is a very unpleasant operation, as the sulphur dioxide gas has a suffocating effect when breathed by the operatives. It has a deteriorating action on the metal work of the stove, and the bleach is not permanent, for on treating the silk with soap or alkalies, its original tint appears again. These defects are lessened by the use of alkaline sulphides, and are entirely avoided by using peroxide of sodium or hydrogen, although the latter is very expensive.

SOUPLE SILK

is, as previously mentioned, the name given to silk from which only part of the gum has been removed, and which has also received special treatment to leave it soft and pliable. There are four operations used in the complete process, viz: (1) scouring; (2) bleaching; (3) sulphuring; (4) softening.

(1) Scouring. The object of this operation is, of course, to remove the grease, but only a part of the gum on the silk, for which reason the process is made less active than with soft silk. The silk is threaded for one or two hours in a bath of 10 per cent. of soap at from 85 to 95 degrees F., after which it is taken out and squeezed. The process removes the grease and a portion of the gum, while it causes the fibres to swell, and so opens the

pores, making it capable of absorbing other materials more readily.

(2) Bleaching. In this case the bleaching operation is done with a mixture of one part of nitric acid and five parts of hydrochloric acid diluted with water to 5 degrees or 6 degrees Tw., usually one part of the mixed acids being diluted in fifteen parts of water. In this weak acid solution the silk is steeped for about fifteen minutes, but not longer, because the silk is liable to become yellow by the action of the nitric acid, since its tendency is to always turn animal substances yellow. After this acid treatment, the silk is well washed in clean water and wrung out, when it is ready for the operation of sulphuring.

(3) Sulphuring is done in the same way as previously described, after which the silk usually has a hard, rough feel, but which is removed by the next operation.

(4) Softening. The silk is boiled in a weak bath of cream of tartar, made up of three-eighths lb. of tartar in ten gallons of water, the silk being left in the bath for from one to one and one-half hours, after which it is wrung out and dried. The action of the tartar is somewhat uncertain and other reagents have been tried, such as Epsom salts, Glauber's salts, with more or less success, but none have proved as good as cream of tartar.

ECRU SILK.

is white silk, from which only a small portion of the gum, but almost the whole of the coloring matter, has been removed. For ordinary ecru silk, the process is usually as follows: (1) Washing in cold water; (2) Washing in 10 per cent. of soap or 80 to 90 degrees F.; (3) Sulphuring; (4) Bleaching; (5) Washing; (6) Sulphuring.

When a very white ecru silk is desired, then the following series of operations are employed; (1) Soaping in a 10 per cent. cold soap solution; (2) Washing; (3) Sulphuring; (4) Bleaching; (5) Washing; (6) Soaping with a 10 per cent. soap solution at 80 to 90 degrees F.; (7) Sulphuring; (8) Washing; (9) Treating with cold weak (1.5 per cent.) soda solution; (10) Treating with warm weak (3 per cent.) soap solution; (11) Washing; (12) Sulphuring; (13) Washing. These operations are carried out in practically the same manner as those already described.

(To be continued.)

BRUSHING, PUMICING, POLISHING AND SANDING OF WOOLENS AND WORSTEDS.

Brushing has for its purpose to clean out the body of the fabric under operation, from any dust, dirt, loose, long and short fibres, and at the same time in connection with face finished fabrics, lay the nap smooth and even, all over the surface, in one direction.

Polishing or pumicing imparts a lustre to the face of the goods, rounding out each thread and giving it the full, rich finish that can be accomplished in no other way. The pumicing cylinders, as used in the machine, constructed for doing this work, are sixteen inches in diameter, and have iron heads with six arms, upon which the lags are mounted. The cloth when applied to a broken cylindrical surface of such large diameter receives a heavy beating effect and vibratory motion. This limbers and softens up the cloth and produces the fine velvety feel that is so desirable. These polishing or pumicing lags are set with alternate rows of the stiffest Russian bristles and fibrous whalebone, with an adjustable steel supporting blade on each side of the lag. This blade prevents the breaking down of the outside rows of bristles and whalebone and greatly increases its durability. It also gives adjustment for wear.

For tightly woven and stiff fabrics, polishing or pumicing is unequaled by any other finishing process. Although primarily designed for finishing plain and fancy worsted and all hard faced goods, it is now used in a more general manner on flannel and light fabrics, golf cloths, and many other goods.

Sanding clears out the face of the cloth, smooths it up, and removes all projections like knots, lumps, and threads. The sanding lags, and of which there are also six to each cylinder of the machine, are covered with the best grade of garnet paper, which is held on by adjustable clamps. Worn out paper can thus be readily, evenly and quickly replaced, the whole expense of reclothing the lags, in labor and material, being insignificant. How-

ever, if so preferred, emery, garnet, ruby, or sand may be applied in the grain direct to the cylinder, when the same is used without lags, or to the lags, if such are used on the cylinders.

The machine as used for doing this brushing, pumicing, polishing and sanding, one or the other or all operations in one run of the fabric through the machine, is built upon the same principle as a regular two or four cylinder brush, according to work required to be done. In this machine the cloth passes from the cloth scray successively over tension rolls, guide rolls, and a steam box into the machine. This steam box may be omitted provided dealing with fabrics requiring no steaming.

When using the steam box, the fabric rests upon the guide or application rolls, running at the same time over the top of the steam box. For operating the steam box, open the drip valve provided for this purpose, then wait until the steam issues through the felt cover on top of the steam box, and when the machine is ready for starting. After the box is thoroughly heated, close drip valve. Leave this drip valve open when machine is not running.

The cloth is then, by adjustable application rolls, applied twice to each one of the two or four cylinders of the machine, revolving at from 350 to 400 revolutions per minute. As mentioned before, two or four cylinders may be used in the machine; however, the general plan is to use four cylinder machines, and of which four cylinders, any number of them may be either brush cylinders, pumicing cylinders or sanding cylinders, just as the fabrics to be finished may require. We may use two of the cylinders for brushing purposes, the other two cylinders for pumicing purposes; again we may use every one of the four cylinders for brushing purposes; again we may use all four for pumicing; again we may use two for pumicing and two for sanding, or in fact any combination of cylinders of the kind mentioned may be used in the machine.

Brushing cylinders are too well known to need lengthy description, they being simply cylinders covered with brushing lags; whereas polishing or pumicnig cylinders, as previously mentioned, consist of six lags mounted equidistant on the cylinders, said lags being set with alternate rolls of stiff Russian bristies and whalebone, having on their two sides a steel strip, in order to keep the rows of bristles from bending over when they hit the cloth.

The sanding cylinder is simply a cylinder having six lags like the pumicing cylinders, the same being covered in this instance either with emery, etc., in the grain or on cloth; again a solid cylinder covered similarly to the lags might be used in place of the six lag cylinder, thus referred to.

Besides using brushing, pumicing and sanding cylinders, any other kind of cylinder might be added to the machine to fulfill certain conditions required for a certain finish of a fabric; for example, a cylinder covered with wire brushes, either in the shape of a full cylinder or in the shape of six lags might be added; again the machines are sometimes built so that one, two or three of the cylinders will treat one side of the fabric, the remainder operating upon the other side, an arrangement especially advantageous for finishing fiannels.

The cloth application rolls, for adjusting the action of the cylinders upon the cloth, are adjustable by the hand wheel for each cylinder, so that the cloth contact can be regulated quickly for light or heavy work, a dial with indicator showing the setting.

After having passed the action of the last cylinder in the machine, the fabric is then guided by means of a suitably located guide and draft roll to a flock brush, which cleans off the back of the goods. After leaving the flock brush, the fabric travels to another draft roll during the work, and from which it is guided to a folder, and from there into the cloth scray which is provided with a tilting table.

When the cloth is to be run out of the machine finally, the tilting table is put in a horizontal position and the cloth is folded automatically on it, whereas when the cloth is to be given a number of runs in the machine, the table is swung into a perpendicular position, letting the cloth drop into the scray for the next run through the machine. This machine can be also specially arranged for wet work,

requiring in this instance a heavy chain drive, draft rolls covered with perforated brass, and wide faced pulleys; dampening rolls or stretch rolls being added if so required.

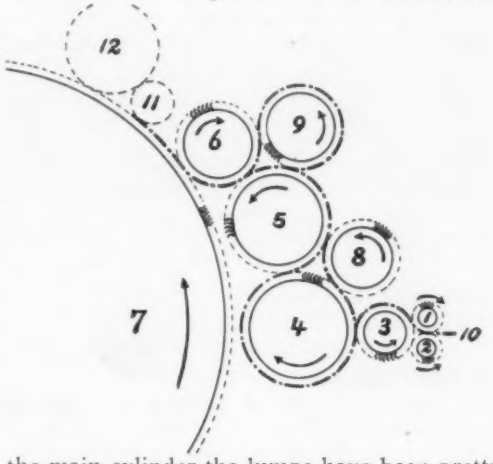
AN INGENIOUS FEED FOR WOOLEN CARDS.

The gist of the novelty refers to a special carding, on a small scale, of the stock previous to its delivery to the main cylinder, i. e., carding proper in the regular manner; the new attachment being applicable both to first and second breakers as well as finisher cards.

The object of the improvement is to thus provide a feed to woolen cards, by means of which more stock can be successfully handled by a given machine in a given time, and this at the same time in connection with an improved quality of the sliver if used in connection with breaker cards, or roving with the finisher card. The increased production results from the accelerated speed which thus is possible to give a card, whereas the improved quality is brought about by working the lumps out of the material as fed, and getting the same into good condition before its delivery to the main cylinder. It is also claimed for the new attachment that its use in connection with the first breaker, the first and second breaker, or all three engines of a set of cards, will permit the handling of a lower grade of stock for a given count of yarn, and thus lower the price of production still more. Although, as mentioned before, the attachment may be applied to all three cards of a set, it more particularly will find use in connection with the first breaker. The new attachment can readily be applied to old as well as new sets of cards and in itself only slightly increases the length of the carding engine to which it is applied, both being also two most valuable features for it.

The accompanying illustration is a diagram in outline, showing the new feeding attachment as applied to a carding engine, only so much of the latter being shown as is necessary to show its relation to the feed. A description of the construction and operation of the new attachment is best given by quoting numerals of references accompanying our illustration, and of which:

1 and 2 indicate the two feed rolls between which the stock, or the sliver, as the case may be (first or second breaker or finisher) is entered to the machine, and from where it is, by means of the leader or transferer, 3, delivered to the tumbler, 4. From here instead of delivering the film of stock, which is now (especially if dealing with a first breaker card) lumpy, coarse, and uneven, directly to the main cylinder, the tumbler, 4, delivers it to an auxiliary cylinder, 5, which has a much more rapid surface speed than said tumbler, 4. Cylinder, 5, in turn delivers the web to the faster running doffer and feeder, 6, and from which it is taken off by the rapidly revolving main cylinder, 7. From this point on, the web takes the usual course and receives the usual treatment. By the time the web reaches



the main cylinder the lumps have been pretty thoroughly worked out and it is finer and more even, thereby adapted to produce a better grade of yarn than if carded without the attachment, owing to the additional treatment of carding the new attachment provides. Furthermore, the time required to produce this improved yarn is greatly reduced by the new feed. In order to still further assist in preparing the stock in the best possible condition for the main cylinder, the two workers, 8 and 9, are provided, and which in their turn split the web twice between the tumbler, 4, and the doffer and feeder, 6. The worker, 8, takes the web, or a portion of it, from the

auxiliary cylinder, 5, and returns it to the tumbler, 4, which delivers it again to said cylinder, 5, and the worker, 9, takes from the cylinder, 5, and delivers to the doffer and feeder, 6, which delivers the now united splits to the main cylinder, 7. The slow running workers, 8 and 9, operating with the comparatively fast running members, 4, 5 and 6, augment the effectiveness of the latter and enhance the efficiency of the feed. The heavy dotted line, 10, indicates the course of the web, through the attachment, thus explained.

The dotted circles, 11 and 12, indicate the positions of the first worker and its stripper, respectively, of the carding engine proper, being referred to merely for the purpose of showing that the new attachment can be applied without disturbing such members when they are located as usual. In short, the only alteration required to apply the new attachment to an old carding engine are simply the providing of suitable bearings for the new parts, i. e., to move back the tumbler, leader, and feed rolls about an inch or replace the old tumbler with one which is an inch or so smaller.

With reference to revolutions per minute and surface speed of the various members of the attachment, the following are a fair average:

Assuming that the
Main cylinder:

(7) = 125 r.p.m. × 18095′ surface speed.

Auxiliary cylinder:

(5) = 260 r.p.m. × 7351′ surface speed.

Tumbler:

(4) = 130 r.p.m. × 4084′ surface speed.

Doffer and feeder:

(6) = 450 r.p.m. × 9896′ surface speed.

Worker:

(8) = 12 r.p.m. × 226′ surface speed.

Worker:

(9) = 8 r.p.m. × 175′ surface speed.

Leader:

(3) = 150 r.p.m. × 1484′ surface speed.

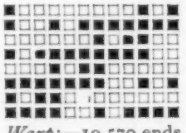
Feed rolls (1 and 2) revolve very slowly, the speed varying according to the weight of stock per yard which is to be run between them.

Although speeds quoted are relatively correct, at least approximately, it is to be distinctly understood that such speeds must vary considerably in different machines and for different grades of stock.

The arrangement of the card clothing, with reference to direction of pointing, on the various cylinder and rolls, is clearly indicated (exaggerated for the sake of clearness). When the arrangement is such that the points of two adjacent teeth upon associated members have the same direction, the teeth are said to be point to point, and when the arrangement causes the points of such teeth to assume different directions, the teeth are said to be point to back, the object of this being to arrange the teeth as to handle the stock to the best advantage. The teeth on the tumbler, 4, and the cylinder, 5, are arranged point to back, and the same is true of the teeth on said cylinder and the doffer and feeder, 6. The teeth on the cylinder, 5, and each of the workers, 8 and 9, are arranged point to point, while the teeth on the workers, 8, and the tumbler, 4, are point to back, as are those on the worker, 9, and the doffer and feeder, 6. The arrows associated with the cylinder, 7, and other rotary members in the illustration indicate the directions in which said cylinder and members are adapted to revolve.

NOVELTIES FROM FOREIGN SOURCES.

Worsted Suiting.



Complete Weave.
Repeat 12 x 8.

Warp:—10,570 ends, 12 or 24 harness, straight draw.
Reed:—18 x 9=65 inches wide in reed.
Dress:—

2 ends, 2/52's worsted, black and green twist.....= 2 ends
1 end, 2/52's worsted, dark slate (opposite twist)....= 1 end
1 end, 2/72's worsted, gray, twisted with 200/2 silk, white..... } × 2 = 6 ends
1 end, 2/52's worsted, black and gray twist.... }
1 end, 2/53's worsted, dark slate (opposite twist }
2 ends, 2/52's worsted, black and blue twist.....= 2 ends
1 end, 2/52's worsted dark slate (opposite twist) .....= 1 end
2 ends, 2/52's worsted, black..... } × 5 = 15 ends
1 end, 2/52's worsted, dark slate (opposite twist) }
1 end, 2/72's worsted, gray, twisted with 200/2 silk, white .....= 1
1 end, 2/52's worsted, black and gray twist .....= 1
1 end, 2/52's worsted, dark slate (opposite twist)..... } × 3 = 9 } × 2 = 24 ends
2 ends, 2/52's worsted, black ..... }
1 end, 2/52's worsted, dark slate (opposite twist).....= 1
1 end, 2/72's worsted, gray, twisted with 200/2 silk, white.....= 1 end
1 end, 2/52's worsted, black and gray twist .....= 1 end
1 end, 2/52's worsted, dark slate (opposite twist) ....= 1 end

2 ends, 2/52's worsted, black
1 end, 2/52's worsted, dark slate (opp. twist) } × 10 = 30 ends
2 ends, 2/52's worsted, black
1 end, 2/52's worsted, dark slate (opp. twist) } × 5 = 15 ends
1 end, 2/72's worsted, gray, twisted with 200/2 silk, white = 1
1 end, 2/52's worsted, black and gray twist = 1
1 end, 2/52's worsted, dark slate (opposite twist) } × 3 = 9
2 ends, 2/52's worsted, black
1 end, 2/52's worsted, dark slate, (opp. twist = 1
} × 2 = 24 ends
1 end, 2/72's worsted, gray, twisted with 200/2 silk, white = 1 end
1 end, 2/52's worsted, black and gray twist = 1 end
1 end, 2/52's worsted, dark slate (opposite twist) = 1 end
2 ends, 2/52's worsted, black
1 end, 2/52's worsted, dark slate (opp. twist) } × 6 = 18 ends

Repeat of pattern 144 ends

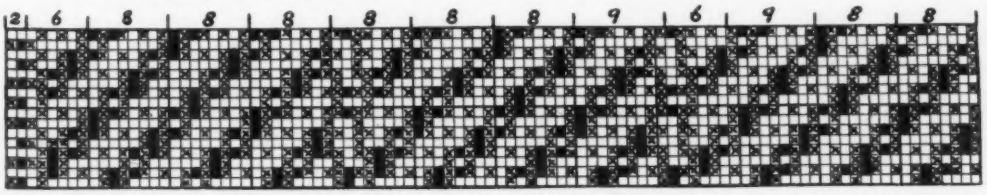
Filling:—110 picks per inch, arranged thus:—

1 pick, 2/52's worsted, black and green twist
1 pick, 2/72's worsted, gray, twisted with 200/2 silk, white } × 2 = 16 picks
6 picks, 2/52's worsted, black
1 pick, 2/52's worsted, black and green twist = 1 pick
1 pick, 2/72's worsted, gray, twisted with 200/2 silk, white = 1 pick
30 picks, 2/52's worsted, black = 30 picks

Repeat of pattern 48 picks

Finish:—Worsted finish, 56 inches finished width.

Worsted Trousering.



Complete Weave. Repeat 96 × 16.

Warp:—7,230 ends, 19 harness fancy draw, 65″ inches wide in reed.

Reed:—15 ×
1 dent @ 2 ends = 2 ends
1 dent @ 6 ends = 6 ends
6 dents @ 8 ends = 48 ends
1 dent @ 9 ends = 9 ends
1 dent @ 6 ends = 6 ends
1 dent @ 9 ends = 9 ends
2 dents @ 8 ends = 16 ends

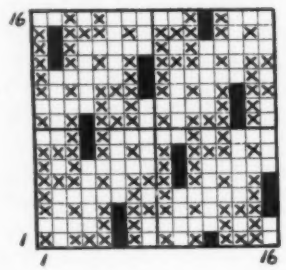
13 dents = 96 ends, as indicated on top of the weave.

Dress:—
3 ends, 2/32's worsted, black
7 ends, 2/40's worsted, gray and white, twist
14 ends, 2/40's worsted, black and gray, twist
8 ends, 2/40's worsted, gray and white twist

32 ends, Repeat in pattern.

Filling:—92 picks per inch, all 2/32's worsted, black.
Finish:—Worsted finish, 56 inches finished width.

Woolen Melton Suiting.



Complete Weave.
Repeat 16 × 16.

Warp:—5,810 ends, 16 harness straight draw.

Reed:—20 × 4 = 70¼ inches wide in loom.

Dress:—
8 ends, 2 ply, 12 run white and 8 run black, twist
8 ends, 5⅛ run woolen yarn } × 9 = 144 ends
4 ends, 2 ply, 12 run white and 8 run black, twist
4 ends, 5⅛ run woolen yarn } × 14 = 112 ends
2 ends, 2 ply, 12 run white and 8 run black, twist
2 ends, 5⅛ run woolen yarn } × 8 = 32 ends

Repeat of pattern, 288 ends

Filling:—85 picks per inch, same counts and colors of yarn, and arrangement of pattern as used in warp.

Finish:—Melton finish, scour, full, clip on shear, press, steam finish, press and steam. 56 inches finished width.

PRACTICAL POINTS IN PRESSING WOOLENS AND WORSTEDS.

While some people may consider pressing the least important of all the operations through which the goods have to pass in the finishing room of a woolen or worsted mill, it is nevertheless a fact that upon the proper pressing much of the good looks of a well finished fabric depends. Certainly with reference to the process, the same as with all the other finishing processes, various notions prevail, and the kind of pressing required for a certain fabric may be frequently regulated more or less by the whims of the commission merchant than by the actual requirements of the fabric under operation.

THE OBJECT OF PRESSING

is to smooth the fabric, by means of ironing it, of all its wrinkles and folds, as well as to enhance its beauty of finish. Pressing is the last operation connected with finishing the cloth, hence this work must be done right, and the machine made to perform its work as perfectly as possible.

With reference to the method of pressing, little difference of opinion can exist; for, although some manufacturers may still think well of the old fashioned method of pressing the fabrics by means of hydraulic hot presses, for the reason that the heat of this method permeates slowly through the fabric, and in

the same way the latter cools off more slowly, however, the days of pressing in this manner have gone by, and the rotary cloth press has entirely, as we might say, superseded the previously referred to process.

Studying carefully the rotary press, there is no reason why the same should not do as good work as the old hydraulic press, and for which reason we will pay no attention to the old process in connection with this article, the only objection to the rotary press might be, that a mill having since years hydraulic presses in use, naturally cling to it, for the reason of saving the cost of a new machine, which, however, we must admit is a poor policy.

Considering the construction of the various rotary cloth presses from their introduction to the present modern machine, we will notice that various modes of constructing and running them have been in use, such, for instance, as leaving the cylinder cold, and heating the press bed, or leaving the press bed cold and only heating the cylinder, again heating them both; the last arrangement certainly being the best, since satisfactory pressing of the fabric can only be had when the machine is properly heated, both with reference to cylinder and press beds, a difference with reference to the final finish, having to be gotten by the variation in this pressure, or a final steam brushing, if such is required.

When fabrics are pressed in this way in connection with one of our modern rotary cloth presses, there should never be a cause for any person to say that the old fashioned hydraulic process was the best, since by means of one of these modern presses, and a good steam brush to be used in connection with it when so required, the fabric will have a finish to satisfy even the most particular commission merchant.

With reference to the style of pressing to give a fabric, its construction and style of finish required, regulate this. For example, in connection with "fine face finished fabrics" where pressing has for its object to enhance the inherent lustre of the fibres, the fabric must be run "face down" in the machine, i. e., with its face to the press beds, and consequently with the back of the fabric to the cylinder, and which in turn will bring out the full lustre on the face of the fabric, the face in this instance being what we might consider ironed on the press beds. If then the lustre obtained is too shiny, run the fabric once or oftener over the steam brush, in order to get this glaziness off its face. This feature at once will indicate to us, that when dealing with fabrics requiring a dull finish, as for example fancy cassimeres, worsted trouserings, suitings, etc., it will be advisable to run these fabrics "face up" in the machine, i. e., with their face to the cylinder (which takes the cloth along, hence no ironing effect to the face), and the back to the press beds.

It certainly is a foregone conclusion, that fabrics previous to running them in one of these rotary presses must be perfectly clean, on both sides, since any foreign matter adhering to the fabrics will leave marks on them, caused by the hot, heavy pressing they undergo, in connection with some makes of fabrics. This feature will indicate to us that the brushes, as on the press, must be kept in the best condition, must be watched carefully, in order that they fulfil these requirements. These brushes, as a rule, deliver, i. e., throw the dirt, as for example, flocks, loose fibres, etc., adhering to the fabric in what is known as dirt-pans, for which reason it will be advisable for the operator to carefully examine the contents of these pans, now and then, in order to see that they do not get too full, since otherwise the brushes will throw this refuse back on the fabric.

Another item which must be taken into consideration is to let the operator watch carefully the fabric when running it in the machine, in order that no wrinkles will occur, since if the latter should form, it will be hard to remove them after pressing; especially must he be careful when the fabric in question has a somewhat long selvage, which in turn readily might be the cause of wrinkles on the sides of the cloth. To avoid this trouble, tighten the tension as much as possible, but this without overdoing the affair, thus giving the stretch roll a chance to assist in preventing the formation of wrinkles. Do not use more tension than required—during pressing. The stretch roll should be fixed so that it cannot

turn if any kind of tension is used, for the reason that if it should flop over, it would narrow the fabric instead of stretching them smooth, in turn causing wrinkles pressed in turn into the centre of the fabric under operation. Should such a case occur, it is necessary to wet the fabric again, since this is the only way to get rid of these wrinkles previously pressed into the fabric. In some instances it will be necessary to wet the wrinkles first, let them get well soaked, and pull out the fabric smooth, before wetting it out again.

Again the trouble with reference to wrinkles may rest in the machine. It may be the cause of the cylinder, which on account of running for any length of time under heavy pressure (especially if dealing with poorly scoured fabrics) may become smooth, and in turn refuse to carry the fabric as it should, in turn causing wrinkles, besides pulling the fabrics out of shape. In such a case, the fabrics will also have to be wet out again, and after drying, re-pressed.

If this occurs, scour the cylinder, a process technically known as "rusting the cylinder," and which is done thus: After the press is cold, apply muriatic acid with a brush, then let the press run with all the weights off for a little while, say about 20 minutes, seeing that the cylinder is wetted evenly. Then wash the cylinder thoroughly, turn on steam and clean up.

The muriatic acid may be used either in its full strength or diluted according to circumstances. Be careful not to touch any other parts of the press but the cylinder. Although brass is not effected by the process, yet it is a good plan after thus drying the cylinder to pull out the brass bed jackets and thoroughly clean and polish them, return them in their proper place and when the press is ready for work again.

Be careful to clean the cylinder, after this operation, for a few days in the morning before starting work, since on account of the process the same will be full of rust after standing all night.

THE GENERAL CONSTRUCTION OF THE MACHINE.

With reference to the rotary press, the same principle consists of a large iron cylinder, placed about in the centre of the machine, and having concave presser beds situated on each side of it.

The cloth is passed to the press first over an adjustable tension rail, then down under a bottom adjustable rail, and again up to an expansion, i. e., stretch roll. Between the two adjustable rails is situated on the inside of the machine a brush which brushes one side of the cloth as it passes to the bottom rail, another brush being situated a short distance from the bottom rail, which acts to clean the other side of the cloth from that cleaned by the first brush. The cloth may be passed either over or under the expansion roll (according to how the fabric is run in the press, i. e., face up or face down), which can be adjusted to stretch the cloth to different widths. From here it passes over a rod, then around the steam heated cylinder between the two steam heated presser beds, where it is thus ironed and pressed.

The cloth emerges from between the cylinder and presser bed and passes over a rod, up over a guiding roll, then to the take up rolls, where it may be folded or wound up into a roll by means of suitable devices attached for this purpose to the machine.

The pressure given to the presser beds is obtained through the levers, thus making it a yielding pressure and one which may be regulated. The beds do not come against the cylinder fixed, which is an important feature in its construction.

It is frequently advantageous in pressing cloth in these rotary presses to give it a lighter pressure, and consequently a different and softer finish, than the machine as thus explained will do.

To accomplish this result, forms the gist of a late invention to this press, the improvements being shown in connection with Figs. 1 and 2, and of which Fig. 2 is an end view of the roll and connecting parts of this press, having the improved devices added, Fig. 3 being a detail in section.

The press as previously explained consists of a steam heated cylinder, A, rotating upon its axle, B, in horizontal bearings and having hollow beds, C, on either side of the roll,

pressed against the roll or withdrawn from it by means of the vertical levers, D, pivoted near their upper ends at d to the frame of the machine and operated by toggle-links (not shown) between their lower ends.

To prevent the beds, C, from coming too near the roll, and thereby pressing the cloth more than is desirable, and yet at the same time to permit the press to be readily opened for the insertion of a new piece of cloth, we find placed upon the axle or bearing of the cylinder, A, a collar partially surrounding the axle and made in two pieces (shown as E). Rods, e, pass through the upper extensions of the two portions of the collar and are made

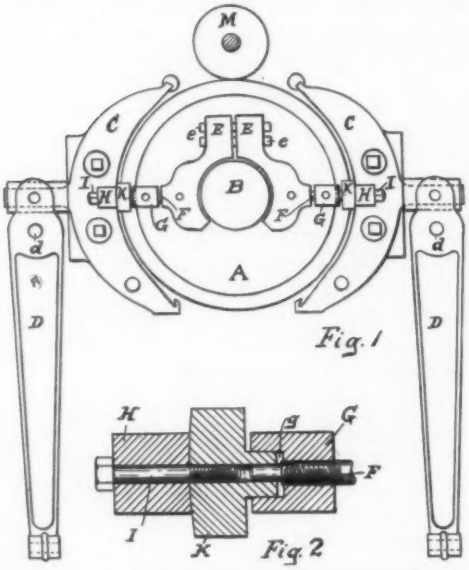


Fig. 1

Fig. 2

rigid in one portion by set screws, while the other portion is free to move upon them and by reason of the slight space between the two portions take up any wear upon the inside of the collar, so that it will always press closely upon either side of the axle, B. Inserted and fastened in each portion of the collar are screw threaded rods, F, upon each of which are screwed nuts, G, which are made with a recess, g, in their outer ends, and the ends of the screw rods, F, extend outward through these recesses, with their unthreaded portion.

Upon each of the beds there is a lug, H, made integral with its bed, and bolts, I, pass through each of these lugs, with a lock nut, K, on their ends, the bolts, I, being made so that they will not pass wholly through the nuts. Each of the nuts, K, is made with a projection, k, to enter the recesses in the ends of the nuts, G, and is also made with a hole or recess within the projection to receive the end of the corresponding rod, F. These lock nuts, K, are screwed up tightly upon the bolts, I.

To set the bed plates so that they will not press too tightly upon the cylinder, A, the nuts, G, are turned upon the threads of the screw rods, F, so as to come into contact with the lock nuts, K, just before the bed plates come into contact with the roll. The required adjustment is very slight, and the threads upon the rods, F, are therefore cut fine, and the nuts, G, are marked with horizontal numbered lines upon their circumference, which, with a fixed line upon the lock nuts, K, serves as a micrometer screw and guide. As the screw rods, F, with their nuts, G, are entirely separate from the lugs, H, and lock nuts, K, the press may be readily opened the required distance for inserting new pieces of cloth, etc.

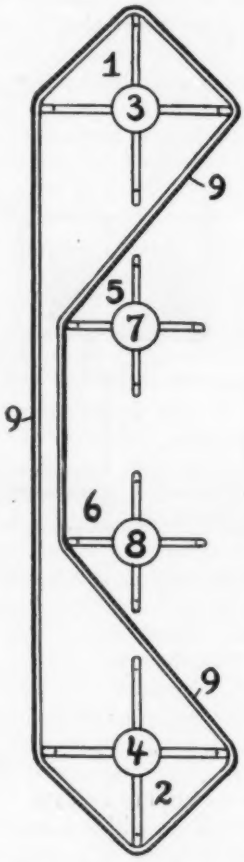
As previously mentioned when explaining the construction of the complete press, it is frequently necessary when light pressure is given to the cloth to provide means for drawing it through the press, providing for this purpose a take-up roll upon the top of the cylinder, A, so that the cloth is wound upon it by running in contact with the cylinder, A. Such a roll as is shown at M in Fig. 2.

AN IMPROVED SKEIN MERCERIZING MACHINE.

The improvement in this machine relates principally to the skein holding frame, as placed in the mercerizing bath, where it is neecssary to have the skeins of yarn kept under tension in order to secure the proper working of the process, the object of the improvement being to provide a frame for holding the skeins in the bath with an even and uniform tension on all of the yarn, both on the inside as well as the outside of the skeins, and which tension has heretofore been more or less uneven, the outside of the skeins having been stretched to a greater degree than

the inside, owing to the outside of the skeins being farther from the reel holding them, than the inside of the skein, said uneven stretching of the skeins resulting naturally in uneven mercerizing.

The arrangement of the frame by which an even and uniform tension is given to the skeins is best shown by means of the accompanying illustration, which is a diagram of



the position of the reels in the frame for holding the skeins, showing a skein held by the reels, said skein, however, being exaggerated in order to show clearly the action of the reels on the tension of the entire skein.

Referring to the illustration, 1 indicates the top reel over which the skeins to be mercerized are hung, and 2 is the bottom reel around which the lower portions of the skeins are placed.

The top reel is mounted to rotate on a shaft 3, one end of which is secured within a vertically traveling bar, and the other end is removably held by another vertically traveling bar, thus allowing said reel to be swung out horizontally when required. Each vertically moving bar is provided with a screw threaded lug, which are engaged on the screw threaded portions of two respective vertical shafts, and by means of handles secured to the top of both shafts the top reel may be raised or lowered to put tension on the skeins or take it off. The bottom reel 2 is loosely mounted on a stationary shaft 4, one end of which is hinged in a lug on the side of the frame, and the other end is temporarily held by a lug on the opposite frame, so that this reel can also be swung out when required, that is, when yarn is to be put in the machine on the reels, or taken out.

In order to prevent an uneven tension in the skeins on the reels, as previously pointed out, two smaller reels 5 and 6 are placed between the two main reels, with their shafts 7 and 8 in the same vertical line with shafts 3 and 4, and thus force the skeins of yarn 9 out of a straight line, as shown. This action will cause a greater tension to be put on the inside of the skein as represented by the lighter line on that side of the two large reels, for the same reason that a greater tension is put on the outside of the sekin as represented by a heavy line, by it passing around the two reels 1 and 2. Thus the extra tension given to the outside of the skein is counterbalanced by the extra tension given to the inside by the two reels 5 and 6, and the tension over the entire skein then becomes uniform.

In placing the skeins on the reels 1 and 2, the same are swung outwardly as explained, after the reels 5 and 6 have been swung away from the opposite side of the frame as a pivot. After placing the skeins on the reels, they are all swung back to the positions shown, and the skeins put under tension by raising the top reel through the mechanism previously explained.

In 1805 the total consumption of cotton by the manufactories of the United States was a little more than 1,000 bales. In 1902 this amount had increased to 4,083,000 bales.

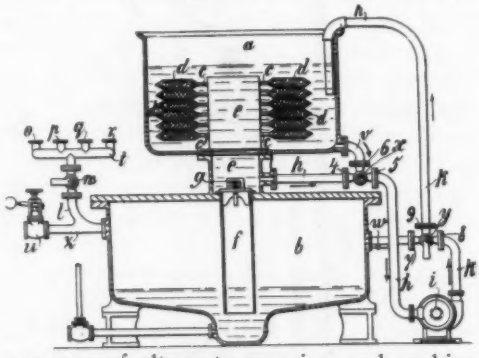
A GERMAN DYEING MACHINE.

This machine is used for dyeing loose material, fabrics and hosiery, or for corroding or bleaching the same, said machine rendering it possible to use compressed air and vacuum only at the commencement of the dyeing process, i. e., for the preliminary dyeing, while the material to be dyed may be observed in an open dye-vat. During the further process of dyeing, however, the bath is driven through the material by means of a pump, with optional speed

The details of the construction and operation of the machine are best shown by means of the accompanying illustration, which is a side view of the machine, partly in section. The machine consists of an open dye-bath, a, dyeing-bath reservoir, b, connections, o p q r, for steam, vacuum, compressed air, and water, respectively a rotary pump, i, and the pipes, l z h k, and stop-cocks or valve, s m x g y. The chamber, e, of the dyeing-bath reservoir, b, can be closed or connected with the pipe, f, as extending into the said bath reservoir, by means of the valve, g, and is connected above with the short pipes, c, as shown. These short pipes, c, are connected with the perforated hollow bodies, d, which serve for reception of the material to be dyed, which in turn is placed within them.

The principal new features of the arrangement are the three-way cocks, x and y, in the pipes, h and k. The three-way cock, x, is connected with the dye-vat, a, by means of pipe, v, while the three-way cock, y, communicates with the dyeing-bath reservoir by means of pipe, w. These three-way cocks, x and y, can be adjusted in such a manner that it is possible to attain the communication, e h x h i k y k a, for the circulation of the dye-bath, while another time the way, a v x h i k y w b, can be taken for this purpose. An overpressure is preserved in the dyeing bath reservoir, b, by means of steam or compressed air. The height of this overpressure can be adjusted according to the material to be dyed and be kept at a constant height during the dyeing process. This is attained by means of a reduction-valve, u, communicating with the reservoir, b, through pipe, z.

The operation of the machine is as follows: When the material to be dyed has been brought into the hollow bodies and the reservoir, b, filled with a solution of coloring-matter, the valve, g, is opened and the three-way cocks, x y and m, are so adjusted that the connection between the pipes, h, with its other portion, h and v, and between k and w, and w and the upper portion of the same pipe is interrupted, while that between the pipes, l t, is effected. Then by the alternate connection of the short pipe, t, with the pressure air or vacuum-conduit, the solution of coloring matter contained in the reservoir, b, is forced outwardly from within by way of the short tubes, c, hollow bodies, d, and through the material arranged on the latter. When



by means of alternate pressing and sucking, the preliminary dyeing is finished, valve g is closed and the rotary pump, i, started. By alternate adjustment of the three-way cocks, x and y, so that the connection, e h x h i k y k a, then the connection, a v x h i k y w b, is effected or the valve, g, closed, it is possible to force the dye-bath contained in the dye vat, a, with optional speed sometimes through the material to be dyed from without and sometimes from within. In the first case, i. e., with closed valve, g, the dye-bath is sucked from the reservoir, a, through the material into the chamber or pipe, e, and gets back into the vat, a, by way of, c h x h i k y k. In the second instance, i, e., with the valve, g, open, the dye-bath is sucked up from the vat, a, by means of the rotary pump and forwarded by way of, k y w, to the reservoir, b, from where it passes through pipes, f and e, by means of the constant counter-pressure to the material, which it passes in opposite direction than before.

CORRESPONDENCE AND NOTES

Upon Textile Topics at Home and Abroad.

LOW GRADE WOOLENS.

WHERE YORKSHIRE EXCELS.

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BY "DELAINE."

It is one of the objects of the improvements in the useful arts to give value to that which possessed no value, to utilize refuse, to economize materials, and as it were, to prolong their usefulness. Why then should not the wool of the sheep undergo a second manufacture, when its usefulness is not exhausted by the first? In England, we are compelled to ascribe much of the prosperity and extension of the Yorkshire trade to the use of shoddy, otherwise the re-manufacture of wool a second time. Even then it is not exhausted, and often is made to undergo a third, and even a fourth manipulation before it has run its course. Its origin dates from 1813 and consists of the tearing up of woolen and worsted rags, to which the names have been given of shoddy and mungo.

The use of shoddy was long regarded with disapprobation as a dishonest adulteration, but found its way into favor by the fact that the finish of beaver and doeskin cloths was improved by a reasonable admixture of shoddy with wool. Both shoddy and mungo give substance and warmth, and will receive a fine finish, but from the shortness of their fibres the cloth made from them often lacks the strength and durability of other textile fabrics. If cloth made from rag-wool is expected to have the tenacity of goods made from new wool, it will utterly disappoint; but there are immense quantities of goods where substance and warmth are the chief requisites, and where ample strength is obtained with shoddy. In other fabrics the body of the cloth is of shoddy, but faced with a veneering of strong material, composed of worsted, or, of worsted and cotton, which provides wearable strength.

The amount of shoddy consumed is understood only when we compare it with the quantity of wool consumed by the woolen and worsted industries. The fiscal question has recently caused considerable research and investigation into the condition of our industries, and has brought forth the following estimate of the quantities of material consumed by the British textile trade,—exclusive of the regular cotton and the silk industries:

Wool...500,000,000 lbs. per annum.
Shoddy.150,000,000 lbs. per annum.
Cotton..100,000,000 lbs. per annum.

Total...750,000,000 lbs. per annum.

The quantity of wool embraces both the woolen and worsted consumption; the quantity of cotton includes the cotton warps used by both industries, as well as the raw cotton which is used for blending purposes by the woolen manufacturers; but the shoddy has no relation to worsted combing and spinning. Shoddy is the specialty of the carded woolen department, however much it may afterwards be combined with cotton, or worsted yarn, in the weaving.

Shoddy has assumed important dimensions as a raw material when it comprises one-fifth of the total material consumed in Great Britain by the wool textile industries. That total is chiefly consumed in the section known as Yorkshire, for the manufacture of medium and low woolen goods. The goods produced in Scotland and the west of England are presumably from pure wool, but the writer has good reason to know that many of them are no longer free from the taint of shoddy. In fact, the popular prices of the day, which now rule the cloth market,

can no longer be met by pure wool.

Of what, then, is this shoddy material composed, which ranges in value from one-halfpenny to one shilling per pound? It is from rags, both new and old, the former being the tailors' and dressmakers' clippings, and the latter comprising the garments and rags which have become old and useless by wear and tear. They are collected from all parts of the world, and are first classified as English and foreign, the former being superior, and the latter inferior, except those from Paris, where superior cloths are largely consumed. From foreign sources, the bales of rags often contain a conglomeration of all sorts, new and old; but the collectors in the more civilized countries know their respective values, and keep them separate. Their classification for the manufacturers is a more serious matter, and is made with great care and supervision. The guiding principles in classification are quality and color, to which may be added, class. At this point, the word "class" has great meaning, and signifies the separation of beavers, tweeds, serges, etc., into their respective classes and names. Their destination is the manufacture of the respective classes of goods from which they are derived, but of lower grade. The respective colors follow in the same order. The following classification is the one followed by good firms.

WORSTEDS.

Black worsted rags, new.
Blue worsted rags, new.
Dark grey rags, new.
Light grey rags, new.
Black serge rags, new.
Blue serge rags, new.
Art serge rags, new.

LAWN TENNIS, WORSTED RAGS.

Fine colored robes, new.
Fine colored merinos, new.
Fine colored white, new.
Fine colored black, new.
Fine colored blue, new.
Blue imperials, new.
Black imperials, new.

WOOLEN RAGS.

Fine dark greys, new.
Fine steel greys.
Fine light greys.
Fine black.
Fine blue.
Fine black vicunas.
Fine blue vicunas.
Fine drab coverts.
Fine white flannels.
Fine blued white flannels.
Fine scarlet flannels.
Fine red flannels.
Fine scarlet military cloth.
Fine red military cloth.
Fine white military cloth.

CHEVIOT RAGS, NEW.

Low coarse mixed, all colors.
Steel mixture.
Brown.
Black.
Blue.
Light grey.

OLD RAGS.

Linsey rags, cotton warp.
Dark grey worsted and wool.
Light grey, worsted and wool.
Black worsted and wool.
Blue worsted and wool.
Steel worsted and wool.
Mixed worsted and wool.

FIG. 1.

By reference to this classification, it will be possible, in due course, to indicate the various descriptions of cloth in which the respective qualities are employed, but they must first be converted into shoddy, which has been dignified by the Germans as artificial wool (Kunstwolle). When intended for fancy tweeds and costume cloths, the colors are dyed in the rag before pulling into shoddy; but many cloths are dyed in the piece after weaving, when the rags are, of course, not dyed in advance.

Before pulling, the rags should be spread on a stone floor and sprinkled with oil of similar quantity to that used to lubricate raw wool. When the rags are pulled in the dry condition without oil, the fibres are broken and the value of the stock is greatly impaired. As a matter of fact, there is room for much experience and skill in the conversion of rags into shoddy, if the materials are to be employed to the best advantage. For instance, the long fibres of worsted rags may be restored to the condition of wool, and will do duty in place of wool, when properly treated. But the treatment is very different to that of the heavily fulled woolens which are firmly matted together.

The dust should be taken out of the rags before they are oiled, and for that purpose the shaker shown at Figure 1 answers well. An ordinary willey with exhaust fan may be

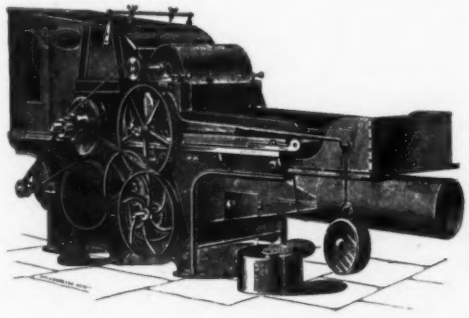


FIG. 2.

employed for this purpose, provided the teeth are few and open. If intended for tweeds, all solid colors should be dyed in the rag, but if for piece-dyeing, the rags must be pulled as they are. The dyer can regulate his shades by stripping. Figure 2 shows the machine for pulling the rags, one machine being suitable for both fine and coarse rags, provided there is an extra cylinder. For fine mungo rags, a cylinder is required with teeth, set 54 over 18 inches, and running 650 revolutions per minute. For stocking shoddy, the cylinder has only 32 teeth over 18 inches, and is run 350 revolutions per minute.

(To be continued.)

As late as 1813 there were but 2,400 power looms in all Great Britain.

CARBONIZING.

Although carbonization has many disadvantages, the saving it effects by doing away with boiling is so great that it has obtained a firm footing in the wool trade.

The injurious action on the fibre is due partly to the high temperature employed, partly to the carbonizing chemical. It has been found that if the carbonizing effect is insufficient it is more a question of strengthening the solution used than of increasing the temperature, but, on the other hand, it has also been discovered that for carbonizing solutions of the same strength any rise of temperature above the normal has a destructive effect on the material. The normal is about 95 deg. C. of sulphuric acid and 120 deg. of aluminum chloride. Excessive temperature is more injurious with the acid than with the chloride. The tendering of the goods increases more rapidly, however, the temperature remaining constant, with augmenting concentration of the carbonizing solution. This is especially the case with sulphuric acid. The best strength of acid to use is 3 1/2 to 4 deg. B.

Chloride of aluminum, which is used on fabrics dyed with dyes loose to acid, is less injurious than sulphuric acid. Its action depends upon the fact that, at temperatures a little above the boiling point of water, hydrochloric acid is set free from it, and destroys the vegetable fibre. The best strength is about 8 deg. B.

One of the most essential requisites for good carbonization with the least possible injury to the fibre is that the fabric must be absolutely clean, and free from grease, soap, alkali, or acid, when it is subjected to the process. These impurities protect the vegetable matter, so that a stronger solution has to be used, to the detriment of the wool. Grease and soap, too, cause the carbonized goods to have a stiff, hard handle, and to be dull and unattractive in appearance. If aluminum chloride is used, and there is any soap or grease present, alumina soaps are formed, and it is they which are responsible for the stiffness which, as is well known, happens so often in carbonizing with the chloride. Al-

kali does the least harm; in fact, its injurious action, if the solution is strengthened by the right amount to compensate for its presence, is confined to wasting the carbonizing agent.

It is of great importance to distribute the carbonizing liquid uniformly over the fabric. The solution must be thoroughly stirred before use, and the goods are entered wet, and, after being well worked in the liquid, are centrifuged. If the piece is wound out of the vat on to a winch, the winch should be turned first one way and then another several times to prevent solution from accumulating in particular parts of the fabric. The use of the winch is not advisable. The piece should pass at once through wringing rollers on leaving the vat, and then to the centrifugal. It is of great importance not to leave the goods lying wet with the carbonizing liquid, especially in the case of sulphuric acid, even after centrifuging. They should go direct to the drying-room. Besides the accumulation of carbonizing liquid in the lower parts of a heap, exposure to light is injurious to soured goods, and also makes unlevel dyeing, as the parts exposed to the light will dye darker than those which have not been so exposed.

Although we still see the old-fashioned carbonization chambers, in which the goods are hung up loose after having been dried, here and there, carbonizing machines after the two-chamber system (a drying and a heating room) are now used almost universally. Whatever system is adopted, the goods must be thoroughly dried before carbonization proper in the hot room. Steam prevents proper charring of the vegetable matter, and must therefore not be developed in the hot room.

It is of great importance to note that it is much better to carry out the carbonization proper by means of a long exposure to a moderate heat than by shorter exposure to a higher temperature, as then the wool is much less affected; 90 to 120 minutes at 80 to 85 deg. C. are better than 45 to 60 minutes at 90 to 95 deg., and 24 to 30 hours at ordinary temperatures (say 16 to 18 deg. C.) will enable the vegetable particles to be rubbed out.

With regard to the question whether it is better to carbonize before or after milling, opinions are divided. The most important argument adduced in favor of milling first, is that if by chance or carelessness any acid or aluminum has been left in the goods, unpleasant complications may ensue on milling. It is also asserted that carbonization makes the material mill less easily. The supporters of the other view say that previous milling makes the stuff so close that carbonization is very difficult, and requires severe treatment, whereby the wool is injured, and that the carbonization partly undoes the effect of the milling. The balance of advisability certainly seems on the side of carbonizing first, and taking care to free the goods perfectly from alumina, etc., before milling them.

Of late, chloride of magnesium has been proposed as a substitute for chloride of aluminum. Whether the substitution is advantageous is doubtful, as the magnesium salt requires a temperature higher by 5 to 10 deg. C. than the aluminum salt to set free the hydrochloric acid. Residual magnesium, too, is as injurious to the after-processes as alumina. The case is different with another proposed substitution, viz., that of acid sulphate of soda for sulphuric acid. A stronger solution is required (5 deg. to 6 deg. B.), but the action is nearly as strong as that of the acid, and the effect on the wool is practically nil. The carbonization after drying requires a temperature of 100 deg. C. for forty-five minutes.

To neutralize carbonized goods, 4 to 5 per cent. solution of calcined soda is used. Stronger solutions hurt the material more than the carbonization itself. The neutralizing bath should be weaker for chloride of aluminum or magnesium, as most of the acid developed volatilizes during the carbonization. When the acid sodium sulphate (bisulphate) is used, the neutralizing bath should not be stronger than 2 1/2 deg. to 3 deg. B. —Deutsche Wollen-Gewerbe.

The papal gloves are made of white wool. This material is supplied by a family which has had the right to do so since 1566. For this purpose the family keep a special flock of fifty sheep whose wool is used only in the making of papal garments.

A STOP MOTION FOR SPINNING AND TWISTING MACHINES.

An English invention for stopping the rollers of spinning frames and twisters when an end breaks has recently been patented in this country. It is designed to prevent the thread or yarn, when an end breaks, wrapping round the delivery-roller and also to prevent the broken end coming into contact with the adjacent thread or yarn on either side of it, and thus avoid doubles or flaws in the yarn consequent on a broken end becoming twisted up with another.

The invention consists, essentially, in so constructing the machine that the top delivery-roller will on the breaking of the yarn fall from its position into a suitable receptacle and there grip or secure the broken end of yarn, so that it can neither lap upon the rollers nor engage or become entangled or double upon an adjacent end or thread of yarn.

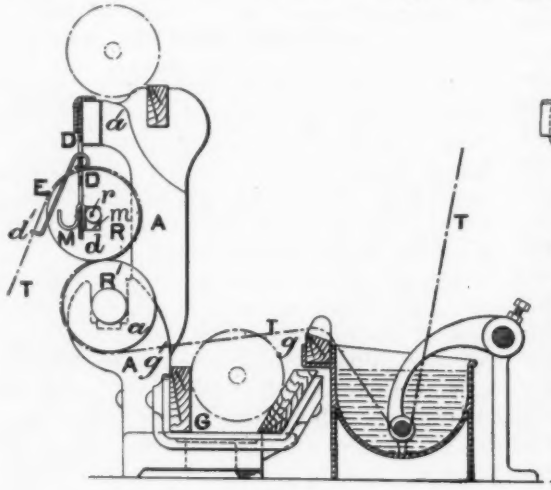


FIG. 1.

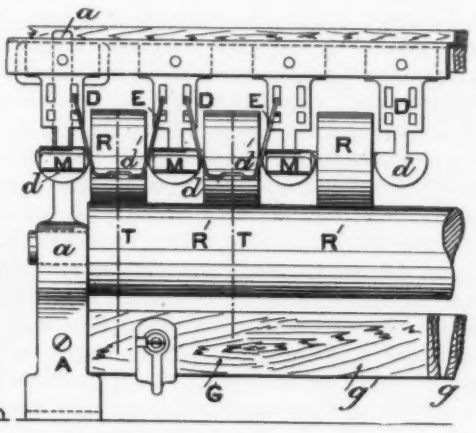


FIG. 2.

Fig. 1 is a transverse sectional elevation through the drawing-head; Fig. 2, a front elevation of same.

The top roller, R, and the bottom roller, R', and the other parts of the machine either for drawing, doubling, twisting or spinning, are of ordinary construction. The bottom roller, R', is supported in the bearing, a, of the roller-stand, A, but the top roller, R, is supported on the bottom roller, R', by a nib or supporting bracket, D, placed at the front side of the roller, against which the journals, r, rest, leaving the roller, R, free to fall off at the back.

The roller stand, A, is made with an arm, a', projecting over to the front side to provide a support for a nib-bar or top roller-support, D. The bar or support, D, is secured to the roller-stand arm, a', by screws and hangs down in front of the journals, r, of the top roller, R. The top roller, R, is set a suitable distance toward the front over the centre of the bottom roller, R', to cause it to change its position as it rotates. The pivots of journals, r, of the top roller, R, rest

against the nibs, d, of the bar, D, by reason of the weight of the roller.

Above the top roller, R, is a swinging loop, E, of light wire, which hangs in front of the top roller, R, and is held out of contact with it by resting upon the yarn or thread, T. The swinging loop is pivoted or hinged in any suitable way either between two bars, D, or in a bearing, D′, and is formed with a yarn guide or eye, d′, along one edge. It rests upon the yarn, T, as it passes from the rollers, R and R′, to the thread-guide or spindle, (not shown), and should the yarn break it falls and engages the top roller, R, lifting it from its position off the bottom roller, R′, and causing it to fall down behind. The light-wire loop, E, when it falls by the breaking of the thread either engages the edges of the top roller, R, and the frictional resistance caused thereby forces the roller backward or the lower edge is drawn in between the nip of the two rollers and dislodges the top one. The light swinging loop, E, may be pivoted to the journal, r, of the top roller, R, and the supporting bar, D, may be affixed to the stand to project up between the two rollers.

Behind the bottom roller, R′, is a receptacle, G, constructed to receive the top roller, R, when it falls and hold it fast. The receptacle, G, is of trough or similar shape, with one or both sides inclined, being preferably wider at top than the diameter of the roller and gradually tapering to the bottom or of any other convenient shape to hold or wedge the roller, R, when it falls into the receptacle. It may be made of two strips, g g′, of wood, iron, or other material, running longitudinally the full length of the frame. The strips, g g′, may, if desired, be padded with felt, cloth, rubber, leather, or other elastic material.

The roller, R, when not in position for working may be supported on the top of the stand in a channel or groove, K, provided for the purpose, or a bracket, M, may be fitted to each of the bars, D, into which the journals of the rollers will fit. The brackets, M, may be of steel tempered or hardened, with an inturned piece, m, against which the journals of the roller, R, bear when at work to prevent the wearing of the bars, D. The brackets, M, can be readily replaced and renewed.

The yarn or thread, T, passes to the rollers, R R′, over the receptacle, G, and when the end breaks the light swinging loop, E, falls against the top roller, R, and causes it to fall back. When the roller, R, is thus thrown back into the receptacle, G, it draws with it the loose end which is round it and falls upon the length of yarn which is stretched over the top and carries it down, thereby holding the yarn against the strips, g g′, and securing it from further movement until released by the operative to piece up the broken end.

CUTTING VELVET.

An article on cutting velvet by machinery which originally appeared in the Textile World Record for February, 1904, was published in Germany by Oesterreich's Wollen und Leinen Industrie and led to the following letter being written to the German journal by a correspondent in Rheinland:

The article on cutting velvet by machinery in Amiens leads me to give you my experience in this line of work in Germany. Franz Mueller in M. Gladbach has been building velvet cutting machines for several years, but they are suitable only for cutting Genoa cord. This Mueller cutting machine originated from an English machine brought to Gladbach and rebuilt by the above named firm. The machine works with as many circular knives as there are ridges in the cord. The knives alternate with rings on the shaft so that the cutters are kept a certain distance apart. The group of knives must have a certain room for play and run on a pin about four inches long. The pins are selected to suit the width of rib desired. The cloth is held very tight by friction rolls, moves steadily under the cutters and is wound on the roll in the same manner as cloth on a loom. The pins are inserted in the rib of the fabric and are alternately pushed forward. The cutters revolve very rapidly and are sharpened during the cutting process by small emery blocks. The cloth runs at a speed of about two yards per minute. If a needle sticks through the cloth the machine stops. This

machine works very well as is shown by the following examples taken from my experience.

One girl will cut 80 meters of cloth per day by hand, the pieces having 165 ribs. The price paid was 3 pfennigs per meter and 30 pfennigs premium.

80 meters at 30 pf.	2.40 marks
Premium	.30 marks
Depreciation, etc.	.20 marks
Total	2.90 marks

The cutting thus cost 3 3/4 pfennigs per meter.

The Mueller machine cuts 600 meters of cloth per day. The price of such a machine is about 4,000 marks, the cost of the process being as follows:

Depreciation 10% per year equals per day	1.30 marks
Power	1. marks
Wages of the operative	4. marks
Repairs	2. marks
Total	8.30 marks

The cost of machine cutting is thus 1 1/2 pfennigs per meter, or 60 per cent. less than that of hand work.

The machine, however, has its disadvantages which are quite evident in certain mills, particularly where ribs of different widths are cut, varying from the wide rib, called Hercules cord, to the very narrow ribs. It is impossible to cut such a variety of ribs on one machine. The Mueller machine is in use in many mills and is giving good satisfaction. The machine-cut velvet cannot be distinguished from that cut by hand. I believe the Mueller machine is the only velvet cutting machine built in Germany.

The Mechanischeweberei, Linden, near Hannover, has a velvet cutting machine which experts consider to be the best. The firm own the patent on this machine and use it only for their own work. It originated in England. Recently two firms have been engaged in constructing a velvet cutting machine in this district. Up to this time it has been possible to do good work only when a single knife is used. M.

[In addition to the above letter the German journal gives a full illustrated description of the Mueller velvet cutter which we shall take pleasure in submitting to any of our readers who are interested in the subject.—Ed.]

ENGLISH NOTES.

(By our Special Correspondent.)

Orders for thousands of pieces of blue milled cloths and khaki army cloth continue to come from Japan. Many hundreds of looms in the heavy woolen district are at work night and day on these goods. This demand contributes to maintain prices of coarse wools beyond the purchasing capacity of many of the manufacturers of regular goods. Although some very handsome paper-profits are accumulating in the wool warehouses, dealers are meeting with the accustomed result of high prices. Sorts are going out of consumption in some quarters in a way that suggests that profits may never materialize.

The inevitable fall, however near it may be, is not actually in sight. Perhaps it will not be precipitated until large quantities of material are unloaded from New Zealand and Buenos Ayres. Today's values are: Super 70 27 pence; super 60 over 24 pence; common 60 a penny less; 40 are firm at 14 to 14 1/2 pence; alpaca around 15 pence.

The fashion of adorning simple cloths with a polka-dot of color has reached the lower grades of material. Common mixture hopsacks worth about 30 cents a yard are improved by the presence of cotton threads, carried as an extra warp at half-inch intervals in the width and appearing at inch distances on the surface. Four ends of brightly colored cotton serve the purpose. Floating over three picks they give the effect of a little oblong spot. It is by the application of devices like this that looms are kept at work during these undeniably dull days.

For ladies' blouses prints are in vogue. Cottons, flannels and flannelettes with grounds of solid color, or with small reserves, are printed with rings (round or oval), circles, squares and the like. There are also some of the ancient pompadour styles on exhibition. Reds and sapphire blues are the popular

ground colorings, but the most salient characteristic is the absence of any considerable amount of white. The aim for the winter trade appears to be the production of garments that look warm, whatever their real protective power may be.

Motoring cloths have been suggested to English manufacturers by the automobile craze and doubtless their sale will grow. Firm, close-set, heavy milled fabrics with the old boiled-finish are most suitable. Something rain-repellant and opaque enough to resist the rush of air by rapid traveling is essential. In view of the dust, tones of brown make the most serviceable colorings. Less is seen already of the hideous leather and black-rubbered clothing that gave motorists the air of brigands or divers. Plain box and melton cloths have been used for overcoats, but it is reasonable to suppose that tweeds of the west of England finish will become popular for motoring suits. Designs are already in preparation by leading firms in the west and American makers of fine goods may profitably test the demand among their own customers.

Some fault-finders are attributing to American strains a certain degeneration perceptible in Australian fleeces. Breeders, in endeavoring to improve the density of the growth, are prone to overlook the liability of converting wool into something like hair. It is claimed that the minute serrations of fibre are being grown wider apart, so that each filament has fewer than formerly. This is not the same matter as a coarsening of the fibres. England has less need of superlatively fine wools than has the Continent and the grumblers complain that the growing smoothness and straightness involves a loss of spinning and felting power out of proportion to a mere thickening of the staple. Whether wool can profitably be grown under the microscope, as it were, is at least questionable. While it is rash to work revolutionary changes without warning it is happily true that the turns of most wools come in their due time and order.

Russian wool in the British markets is an inappreciable factor. The days when Donskoi was heavily imported are gone and an examination ought to show that Russian staple is more favored in America than on this side. Some remarks of our Consul at St. Petersburg are perhaps more to the American than the English point. The production diminishes in the face of rising land values and arable areas and the absence of organization in the trade. It is suggested that foreign buyers should deal with the farmers who are at present at the mercy of the chances of the fairs, which are still held annually at Kharkov, Rostov-on-Don, Tsaritsyn and Warsaw. Having no warehouses the pastoralists heap their wool for months in the open exposed to the falls of rain and snow. Adequate measures being taken, it is presumed that enterprising buyers could do better than wait for the fairs.

With the New Year a change in the procedure of the British Patent Office comes into force that is important to Americans who protect inventions in this country. The officials will make a search of the records of the fifty years previous to ascertain whether, wholly or in part, the inventor has been forestalled. The search gives no actual guarantee of novelty and the authorities disclaim responsibility for any error. Should report be adverse it will be open to the comptroller of the department to insert a reference to prior specifications in the patent letters that are granted. For their pains the authorities may demand an additional charge of not more than five dollars.

A MILL FOR SPINNING COTTON WASTE.

The accompanying illustrations show the plan of a mill designed by Sequin & Knobel, in Ruti-Zurich, Switzerland, for manufacturing cotton waste into yarn. The processes include mixing, opening, cleaning, carding and spinning. The raw material passes through the wide tower at the front of the building into the mixing room, C. Bales are here opened and the material layered in large piles to make the stock uniform. The material is then opened and cleaned in the Creighton opener running 1,000 turns per minute. This machine is connected with a beater running 900 turns per minute. The stock now passes to the picker in the room, B, where it is prepared for the carding process.

Fig.1

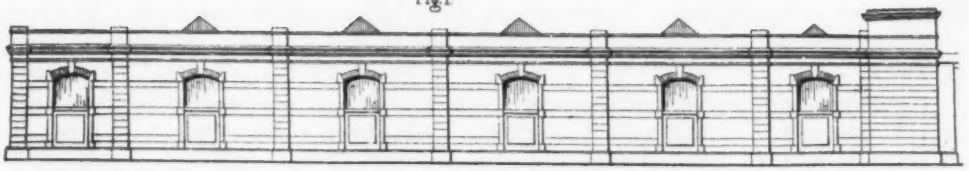


Fig.3.

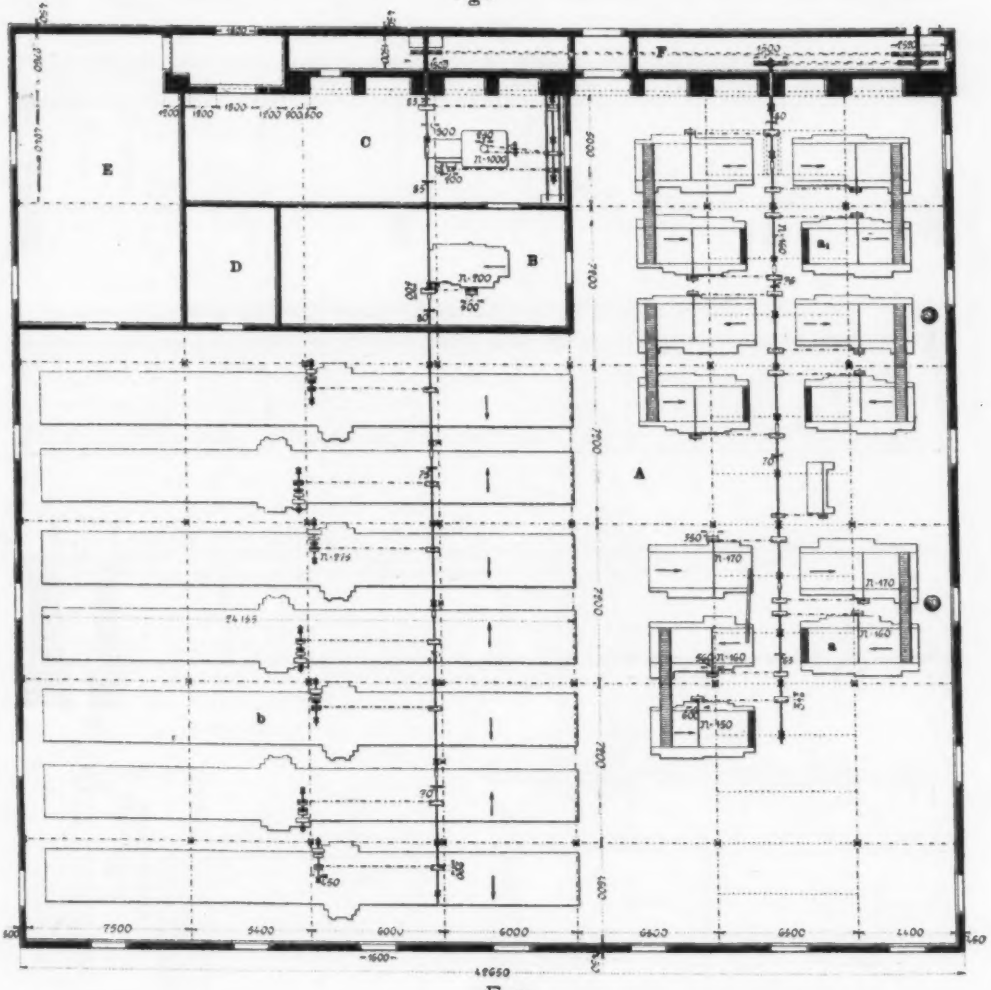


Fig.7.

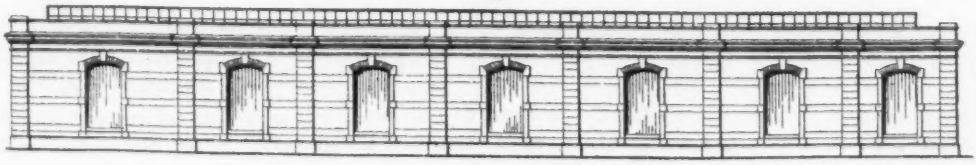


Fig 2

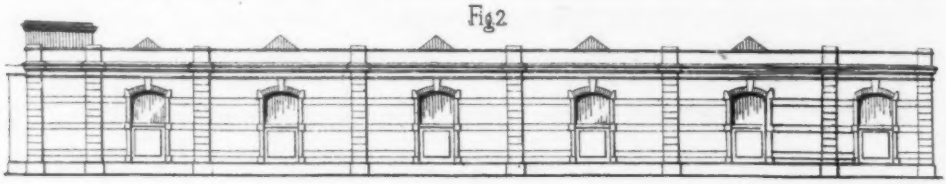


Fig 4.

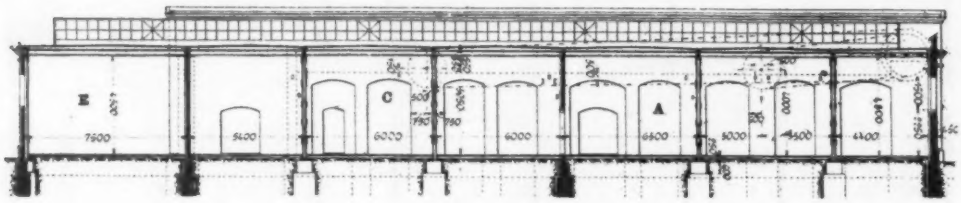


Fig 5.

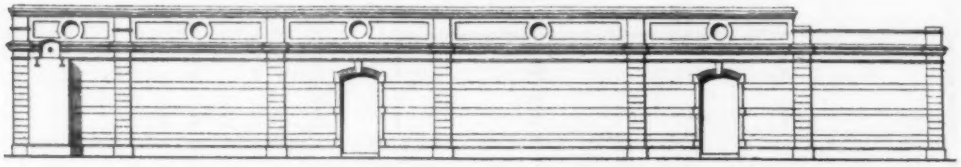


Fig 6.

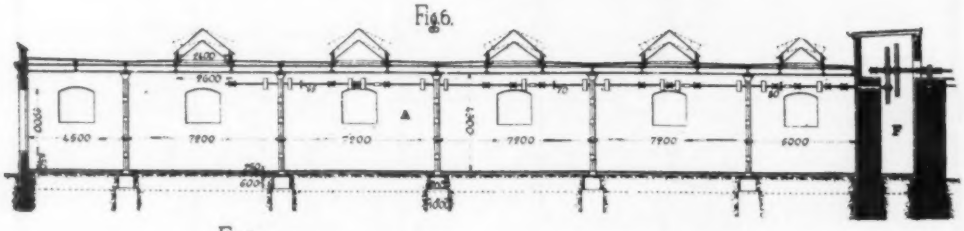


Fig 8.

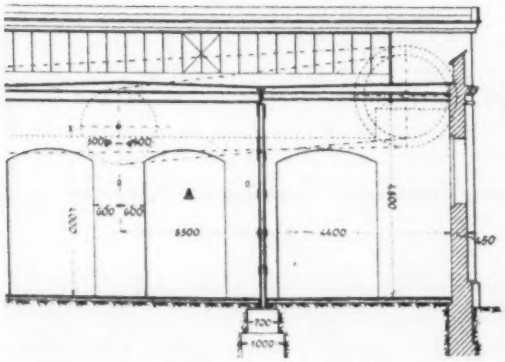
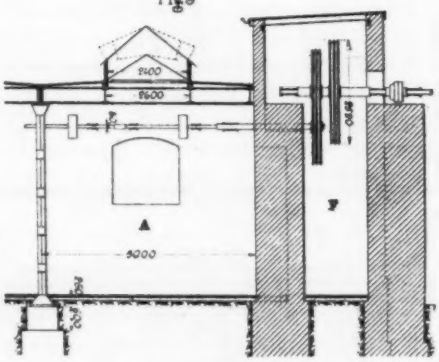


Fig 9



As ordinary cotton fibre will not stand a 3-card process of carding, each set consists of only two cards. Four sets of double cards, two on each side of the driving shaft, are placed at one end of the card room, A. At the other end, at the left of the driving shaft, is one 3-set card for fine work. At the right of the shaft is a 2-card machine (a), making six sets in all, each being 60 inches wide. The movement of the cotton is indicated by

the arrows on the machine. The shaded part of the card indicates the automatic feed between the breaker and the finisher. The card grinder is located in the middle of the card room. The breaker cylinders run 170 and the finisher cylinders 160 turns per minute. The carded roving is carried from the finishers to the mules (b).

Spinning is done on seven mules of 480 spindles each, making a total of 3,360 spindles. Each machine has 210 spindles on one side of the head and 270 on the other. It is estimated that this mill will produce 2 1/2 pounds of No. 7 yarn per spindle in 56 1/2 hours. The total production of the mill would, therefore, be 8,400 pounds per week of 56 1/2 hours.

The room, D, is used for a tool room. The space, F, is for the driving belts. The main driving shaft passes through the wall and the power is transmitted by means of ropes to the card room and spinning room shafts as shown at Fig. 3. The building is square and lighted and ventilated by skylights as shown in Figs. 4 to 9. Figs. 1, 2, 5 and 7 are elevation plans. The turrets are provided with double glass. The roof is flat, the turrets being very low and practically level with the gutter on the roof.

The chief advantage of this form of roof construction consists in the horizontal position of the beams. It permits of the building being easily extended. Snow gives much less trouble with this form than with the ordinary one. The roof is supported by iron columns and consists of an iron frame work on which wooden beams rest. These beams are beveled. The thick side comes against the row of pillars while the beveled side comes opposite the next row of beams. In this way the roof pitches to the centre of each space between the windows.—Translated from Uhland's Technische Rundschau by the Textile World Record.

The invention of the fly shuttle by John Kay in 1733 caused great commotion among the weavers in England, and he was so persecuted because of it that he had to leave the country.

A CENTRIFUGAL BOBBIN HOLDER.

A device for holding the bobbin on a spindle by centrifugal force during the process of spinning or twisting has recently been patented in this country and is shown in the accompanying illustrations. The clutches or engaging devices are pivotally sustained in substantially vertical positions between the spindle and the bobbin, and when motion is imparted to the spindle they are rotated horizontally on their axes by the centrifugal action produced by the rotation of the spindle or by said centrifugal action aided by atmospheric resistance until the outer edges of the clutches are thereby brought into contact with the walls of the chamber in the head of the bobbin.

Fig. 1 is a view in elevation of a portion of the new spindle with a bobbin in position.

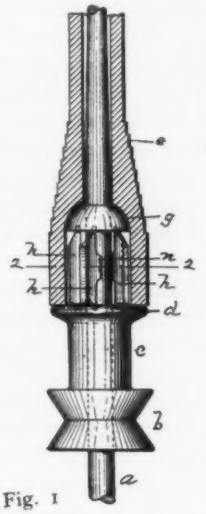


Fig. 1

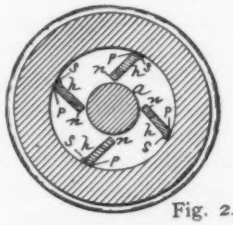


Fig. 2.

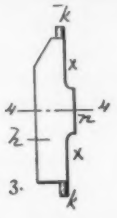


Fig. 3.

Fig. 4.

Fig. 2 is a section taken on line 2 2, Fig. 1. Fig. 3 is an elevation of one of the clutching-blades. Fig. 4 is a section taken on line 4 4, Fig. 3.

(a) represents a spindle of ordinary construction provided with the rigidly-attached whirl, b, from which there extends upward the sleeve, c, broadened at its upper end into or provided rigidly with the annular platform, d, on which rests the head of the bobbin, e. At a distance above the platform, d, near the front of the upper end of the

chamber in the bobbin, a collar, g, is secured to the spindle.

Pivotally sustained in vertical positions between the annular platform, d, and the collar, g, and between the spindle and the walls of the head of the bobbin are the clutching-blades, h, whose upper and lower pivot-pins, k, extend, respectively, into suitable sockets in the collar and platform. These pivot-pins are so placed as to bring the axial or pivotal line toward one of the vertical edges of the blade, and the edge lettered, x, which is nearer the axial line, is preferably provided with a small extension or projection, n.

It will be seen by reference to the drawings that the greater portion of each blade is that which is next the edge opposite the edge, x, but that the projection, n, is long enough to prevent the blade from making a complete rotation, as before the completion of the rotation the projection will strike the spindle. Even before the projection, n, struck the spindle the outer edge of the blade would come in contact with the walls of the chamber in the head of the bobbin. The blades are all disposed so that as they lie in an approximately tangential position with relation to the spindle, they all point in the same direction around the circle.

When rotation is imparted to the spindle, the outer and broader portions of the clutching-blades, h, swing outward by reason of the rotation of the blades produced by centrifugal action until the outer edges come in contact with the walls of the bobbin-chamber. As the portions of the blades on the outer side of their pivots exceed in breadth the distance in a radial line between the pivots and the walls of the bobbin-chamber, the outer edges come in contact with the walls before the blades can reach a radial position, and the blades when in contact with the bobbin are therefore in an approximately tangential position, or in a position which is between a tangential one and a radial one.

It will be observed by reference to Fig. 2 not only that the greater area of the blades is beyond or outside their pivotal or axial lines, but that the portion, n, is too narrow to come in contact with the spindle when the bobbin is in position, as if it came into such contact with the outer edges it would not be free to make a full engagement with the bobbin. The object of the portions, n, is to keep the blades in the same direction when the bobbin is not in position, so that the edges, p, of all the blades will engage the bobbin. In order to accomplish this, the portion, n, must extend farther than the distance in a radial line between the pivot and the spindle.

HOW TO SET CARDS FOR SHODDY AND MUNGO MIXES.

BY SAM DRIVER.

Mungo or very short shoddy is produced from hard felted cloths such as beavers, doeskins, etc. Shoddy is produced from cassimeres, worsteds, delaines, knit goods, etc., and is a much longer staple than mungo. Not many years ago it was thought that any old sets of cards with card clothing half gone were good enough to card shoddy lots. Things have changed wonderfully since then. Carders have found out that the lower the stock the finer and the better the card clothing must be.

The workers and doffers must be kept good and sharp. These and the cylinder should be kept brushed out every two weeks. A false worker is a good thing in any card room and can be used to good advantage in keeping the workers clean, sharp and smooth, all the time. The points of wire can be kept well polished and quick to catch the stock and quick to let go.

Good judgment shouold be used as to how long the cards should be used without stripping. In order to make even roping they should be stripped before they begin to make uneven roping. Here is where many carders make a failure in carding low stock, in neglecting to see that the cards are properly stripped and at the proper time. It is better to strip them too early than too late. Much uneven roping is made by putting up the drawing before the card gets filled up after being stripped.

The greatest secret in carding shoddy lies in keeping the points of wire sharp, smooth and clean. The speed of the cylinder, 90

turns; doffers, 15 turns a minute; graduate the speed of the workers, driving the first the fastest, the next slower, and so on, the one next the fancy running the slowest. If any part of the card is out of true, stop at once and true it. It is not the closest setting that does the best carding. There has been more loss of time and bad carding made by too close setting than in any other way. If set too close the points of wire strike and dull the points. It is better to be on the safe side than set too close. What is the use of grinding points on the wire and then knocking them off again with too close setting? In setting use the 28 gauge; first set the tumbler to cylinder, then set the leaderin to the tumbler very close and not strike; then set the feed rolls to the leaderin with gauge. Set the workers progressively, commencing by setting the first farthest off. Set the strippers as close to the cylinder as possible and not to strike, also set the worker close to the stripper, set the doffer by 28 gauge, set the fancy on quite hard. Keep the stripper belts tight and clean. For low stock move the first and second breaker frames within six or eight inches of each other and connect them by an endless apron something after the principle of a Blairmire feed; this will save waste and lots of trouble. There will be no drawing to break down, besides it makes more room.

The second breaker and finisher can be set the same as the first, only set the strippers off from the cylinder on the finisher; set the top doffer quite loose and the bottom doffer quite tight; condense the roping quite hard and see that it is not winding too tight on the spools. Give a long draught of roping, say, two-thirds draught or more.

By following this article there will be no trouble in getting off good work from low stock. The best plan is to make the roping the size the spinner can handle it the best. The best way to keep the stock or shoddy from dropping under the card, is to keep the working points of the cylinder as clean as possible. It is not best to have the cards stripped all through every time; the best plan is to strip only those parts that are dirty. To strip the cards through every time is a waste of time and labor. Keep the points of the strippers clean.

Many carders fail to succeed with shoddy, not because it is simply shoddy, but because of the dirt and flocks it contains. There are various devices to prevent dropping by catching and returning them to the card, and one of the most common is the semi-circular screen set close and underneath the cylinder. The screens get choked up with dirt and flying, and then both dirt and flying goes back into the card again and in the goods. These devices have never become general on woolen cards. In carding shoddy dirt is the worst thing there is to fight against.

The writer has had years of experience in carding these low materials and would advise those who have had trouble in carding short stock to study this article carefully and earnestly, because it contains information which is the result of many years of practical experience on this class of work.

REACHED THE LIMIT.

Some interesting stories are appearing about Russia's efforts and Russia's failures to squeeze war fund contributions out of her rich manufacturers. It is stated that Grand Duke Sergius of Russia was sent in person to Warsaw and other cities to raise the fund. He sent for the great manufacturer Mosoroff and told him the amount levied upon him and the other Warsaw manufacturers. Mosoroff declined to pay a single ruble. He declared he was providing for the widows and orphans of his workmen, paying his just taxes, and that those who started the war could pay for it. The grand duke created a terrible scene. In his rage he ordered Mosoroff's arrest and deportation to Siberia. Mosoroff immediately ordered all his factories closed and his workmen informed of the reason. The public demonstrations that instantly followed were too overpowering for the grand duke and Mosoroff was quietly liberated. His factories are now again running.—American Machinist.

For more than fifty years Dundee, Scotland, has been the seat of the largest burlap manufacture in the world, importing nearly two million tons of raw jute annually from Bengal.

A WARP TWISTING MACHINE.

An automatic warp twisting machine, invented by Gustave Hiller, a manufacturer of Zittau, Germany, is described in a recent report by William J. Pike, U. S. consul at that place, who saw the machine in operation.

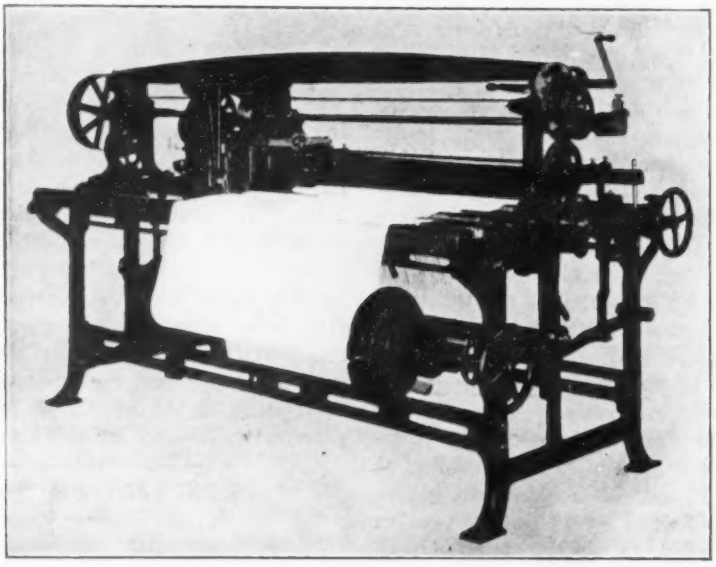


FIG. 1.

As is shown by the accompanying illustrations, both warps are put into the machine with cross rods in such a way that they are directly opposite each other, and the ends are held together by a press, which is lifted by the machine, in order to slacken the warp, at the moment that the two threads which

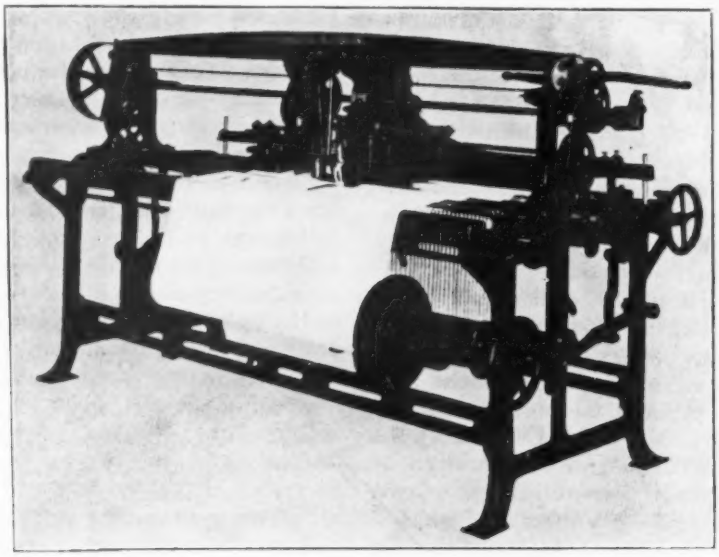


FIG. 2.

are about to be fastened together are taken into the twisting apparatus. The machine works automatically; takes a single thread from each warp, cuts them, and twists them firmly together.

Fig. 1 shows the mechanism, which moves above the warp, about to begin the operation of twisting on the first ends. Fig. 2 illustrates the machine in the middle of the warp

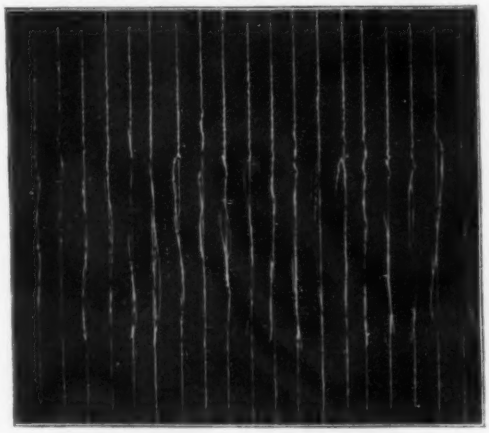


FIG. 3.

after having twisted one-half of the ends. Fig. 3 shows the threads spliced by the machine.

It is applicable to all classes of yarns, cotton, wool, linen, or silk, and is able to twist about 2,500 ends in an hour, whereas a good hour's work for an expert twister is said to be from 800 to 1,000.

MEMOIRS OF A VETERAN MASTER MECHANIC.

X.

BY EBEN GOULD.

While the new buildings were being built in 1860, the walls were up about the first story when the news came of the fall of the Pemberton Mills, in Lawrence, Mass., a terrible disaster, in which about 1,000 persons lost their lives by being buried in the ruins. That put a stop to the building until the plans were altered and the brick walls were made stronger so that, when finished, the top story walls were as heavy as the first story was intended to be in the first place. The shafting for all these new buildings was made in the mill repair shop, the large pulleys being bought from other shops.

I believe it was in 1847 that the first pump I ever saw was put in the Harris mills. It was the only one in Woonsocket at that time, and people came from other mills in the neighborhood to see it. Soon after this, one was set up in the mill at Slatersville, apparently in good shape, but on their trying to start it up it would not work at all. They had seen the one at Harris', which worked all right, and could not understand what the trouble was with their pump. Down they came to Harris to see if any one could tell them why their pump would not work. Harris told my father that he better go to Slater's mill and see what the trouble was. When my father got there, he found that in piping the pump they had put in the suction pipe where the discharge one should have been, and the discharge pipe where the suction pipe should be, so that in place of pumping water from the river into the tank, it was in good shape to pump water from the tank to the river, if there had been any in the tank to pump.

In 1858, Mr. Edward, son of Mr. Twitcher, came to the mills in the capacity of super, also to perfect himself in the business of a woolen manufacturer. At first he did not seem inclined to be agreeable to me, but afterwards became very pleasant and friendly. He went from the Maverick mills to be agent of the Dracut mills, near Lowell.

For several years I was quite busy making the shafting for the new buildings and placing the machinery in the same until the mills were more than double their former capacity. All the old gearing and upright shafts had to be changed and replaced by new shafting, so that in 1864, when the Merchant Woolen Co. bought the mills there was none of the old uprights and gears left.

(To be continued.)

The first power loom in America was set up in Waltham in 1815.

Questions and Answers.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Cost of Raw Material.

Editor Textile World Record:

We have run our woolen material heretofore on Kentucky jeans, but recently have begun the manufacture of a so-called all wool piece dyed cheviot, made from a mixture of coarse wool and waste. We had determined the shrinkage in manufacturing and cost of our jean fabric very closely from statistics of operations during previous years. We have no such satistics to guide us with the new cloth and have estimated the cost as best we can. We would like to know what is the best and quickest way of testing the accuracy of our estimate as we do not want to continue manufacturing the goods if the business is to result in a loss.

Chattanooga (455.)

The cost of raw material can be determined by keeping a record of a lot of stock; the larger the lot the more accurate is the test. The record should be kept of the weight and value of the raw material as well as of the waste obtained from it, also of the number of yards of finished cloth made from the lot of stock selected for the test. Following is the record of a test of piece dyed cheviot fabric which will illustrate the method:

Stock weighed in the picking room,	
6,790 lbs. wool, at 45c. per lb.	$3,055.50
12,576 lbs. waste, at 15c. per lb.	1,885.60
Total	$4,941.10
Waste made from this batch,	
2,904 lbs. at 15c. per lb.	435.60
Net cost of stock	$4,505.50

The finished cloth obtained from this material amounted to 7,227 yards 6/4. The cost of the raw material per yard was therefore:

$4,505.50 ÷ 7,227 = $0.623, cost of raw material per yard.

There is no method as simple as this for determining the cost of manufacturing. The best method is to extend the product for any period between inventories at the estimated cost and then comparing the total with the actual cost as indicated by the mill accounts.

Slipping of the Filling on the Warp.

Editor Textile World Record:

We are making goods with 27 threads per inch in each direction for warp and filling, woven with a 4 by 4 basket weave. During the washing process the filling slips on the warp giving the cloth a wavy appearance. Fulling the goods before washing has not removed the difficulty. What is the cause of this slipping of the filling and how can it be remedied? Ein Deutscher (411.)

This question appears in Das Deutsche Wollen-Gewerbe, and is answered by N. Reiser as follows:

It is practically impossible to make a smooth, perfect fabric with hard twisted yarn having an open set and as loose a weave as the fabric referred to. With the greatest care the filling will

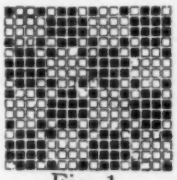


Fig. 1.

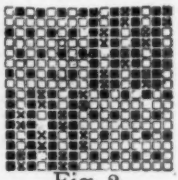


Fig. 2.

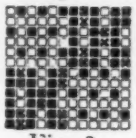


Fig. 3.

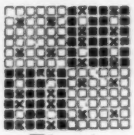


Fig. 4.

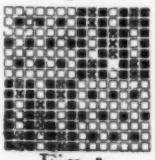


Fig. 5.

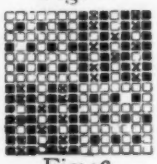


Fig. 6.

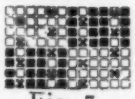


Fig. 7.

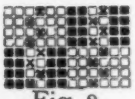


Fig. 8.

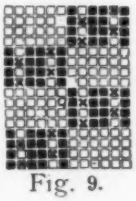


Fig. 9.

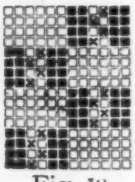


Fig. 10.

slip out of place by reason of the friction during washing, fulling and pressing. I would make the following suggestions regarding the difficulty:

1. In case a stock of goods has already been woven, send them to a chemical scourer to be cleaned by first winding on perforated rolls and

then forcing benzine through the pieces. The goods are then pressed in a hydraulic machine.

2. In place of the regular 4 by 4 basket weave, use that shown at Fig. 1. It gives practically the same pattern and prevents the slipping of the filling.

3. Make the goods by the French method, which consists in the use of a cotton binding thread in warp and filling as shown at Figs. 2 to 6. Fig. 2 is the weave generally used. The cloth is dressed and woven 1 wool 1 cotton. Fig. 3 shows this method adapted to a 3 by 3 basket weave. Fig 4 is a 4 by 4 basket weave with every third thread a cotton binder. Figs. 5 and 6 show the 4 by 4 basket weave with every other thread a binder except at the junction of the basket figures at the beginning and the end of the weave, where two wool threads come together. By this arrangement the number of binder threads is reduced one-fourth.

4. Try the weaves shown at Figs. 7 and 8 in which the binders are in the warp only. The threads marked with black squares are woolen, the others cotton. After weaving, the goods are washed, fulled and gigged if necessary. They are then carbonized, if wool dyed by aluminum process, and then finished. It might be well to press in the hydraulic instead of the rotary machine. Figs. 7 and 8 can be changed as shown at Figs. 9 and 10. The carbonizing can then be omitted.

"Prove all things; hold fast that which is good."

Perforated Rolls for Steaming Cloth.

Editor Textile World Record:

What are the advantages and disadvantages of large and small perforated rolls for steaming cloth? We are now steaming our goods on an ordinary steam gig with 7-inch rolls, and are informed that better results can be obtained at less cost with the use of a regular steaming machine with larger rolls.

Stein (457.)

Increasing the size of the rollers enables a larger quantity of cloth to be wound without any increase in the thickness of the cloth through which the steam is forced. Two pieces of 24-ounce worsted serge measuring 79 1/2 yards were wound on a 7-inch roll and the cloth was five inches thick. It would, however, take 152 1/2 yards of the same kind of cloth wound on an 18-inch roll to make a thickness of 5 inches. Experience has shown that with copper of the ordinary thickness, 1/8 inch, it is not safe to increase the diameter of the perforated roll beyond 18 inches. If made larger than that the pressure of the air when the steam is condensed inside the cylinder is liable to cause the cylinder to collapse.

Looms for Weaving Lace.

Editor Textile World Record:

We would like to have the address of builders of looms for weaving torchon and Valenciennes lace.

Torchon (468).

Most of the looms for weaving Valenciennes and torchon lace are built in Nottingham, England. Nottingham looms are used on the Continent as well as in England. We have advised our correspondent by mail of the addresses of a few of these builders.

Testing the Lustre of Mercerization.

Editor Textile World Record:

I would like a method for testing the permanency of the lustre on mercerized cotton fabrics.

Oakland (465).

The permanency of the lustre on mercerized cotton can be tested by washing the goods thoroughly with soap and warm water and then drying them. This will remove any lustre due to pressing and yet will not affect the lustre caused by the mercerizing process. By subjecting samples of different mercerized fabrics to this test and comparing them both before and after the operation, a very good idea can be obtained as to how much of the lustre is due to other causes than mercerizing.

Japanese Isinglass.

Editor Textile World Record:

To what extent is Japanese isinglass used in the textile industry and for what purpose? Where can it be bought? Chemung (454.)

Enquiries fail to show that it is used to any great extent in this country. A staff correspondent at St. Louis to whom the question was referred writes that the genuine Japanese isinglass is derived from a certain species of fish. The crude grades are known commercially as "fish glue." Inquiries of the gentleman in charge of this section of the Japanese exhibits fail to indicate where the final outlet is, but as they consume large quantities in Japan as a finish for textiles the inference is that it is used for a similar purpose in America.

Japanese isinglass, or any other highly refined gelatine, is used for sizing for fine warps, and also worked up into finishes, especially for cottons and linens.

Fine quality isinglass is also much used in making certain kinds of very adhesive cements. Some proprietary cements now on the market are composed of isinglass (fish glue) and ordinary bonnet glue, the white glue of the cabinet maker.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 232 to 253. Also Buyers' Index.

KNIT GOODS SITUATION.

The manufacturing situation is not as generally healthy as might be desired. Mills throughout the country are not as a rule running full time. This is especially true of mills producing light weight cotton underwear. Fleeced manufacturers are making free shipments and mills making wool goods are running full time. However, spring business shows some improvement, accounted for by the fact that salesmen are now getting their advance orders from retailers on spring lines and the jobbers are in consequence increasing their original orders and also adding some new numbers.

It is stated that a number of buyers placed their orders very sparingly on some lines in anticipation of lower prices and as they have commenced to sell goods, are now placing duplicates at the same prices, as lower quotations are not obtainable. This is particularly true on Balbriggan lines and some liberal orders have been placed only recently.

The manufacturers' complaint now is that they have quoted prices altogether too low on the orders they have taken and unless there is a change to a considerable lower basis of raw material cost, a fair margin of profit is very unlikely, if not practically impossible.

From reports by salesmen soliciting retail business, we gather that in ladies' straight ribbed goods, it is the plain trimmed styles that are being taken very largely in full range of prices, the buyers passing the lace yokes and wide, gaudy trimmings of past seasons. Plain two and two ribbed goods are mostly selected with a few Richelieu ribs, but it is a difficult matter to get orders on fancy stitches of any kind.

It is also noticeable that buyers are showing considerable attention to the width of the ladies' straight ribbed goods and numbers made on the narrow cylinders without considerable elasticity are not selected, buyers stating that they have had considerable difficulty this past season on account of narrow widths of many lines. Manufacturers should take note of this and bear in mind that the woman who buys a vest at 10c. or 15c. wants a full size garment, as well as if she pays 50c., and have the difference in price show in the quality or trimming and not in the size of the garment.

Trade in ladies' union suits is increasing and buyers are adding new lines for the coming season. There is also an increased demand for ladies' equestrian tights made with a cuff at the knee and tape at the waist and it is noticed that there is some falling off in the trade of lace trimmed pants.

There are some very handsome styles of men's goods shown to retail at 50c. in black and white and tan and white mixtures. We illustrate at Fig. 1 one of the best selling numbers taken from a representative line. We also show at Fig. 2 a novelty in men's undershirt made with a collar and wristband, and the agents who have this line record large sales on this number in localities where there is a trade with shop workers. The trade in men's ribbed goods is being done almost entirely on plain colors, such as blue, salmon and tan, there being little if any demand for fancy stripes or mixtures in ribbed goods.

On fall goods, the jobbers reported a satisfactory run of orders on advance business, but the operation for new business continues on a conservative basis, and buyers do not seem to be interested at the present time in duplicates. As far as fleeced underwear is concerned, there seems to be a general belief that the demand will show a steady decline and that jobbers will welcome the return of ribbed goods or the merino improved as they have been of late and that they will use greater efforts to market these goods than they will in selling goods in which there is little or no profit. A number of manufacturers still have fleeced goods to sell and no doubt some concessions from the regular asking prices may

be had by those who are open to place any orders.

Considerable complaint is heard from buyers on the quality of fleeced goods that have been delivered. At the same time manufac-

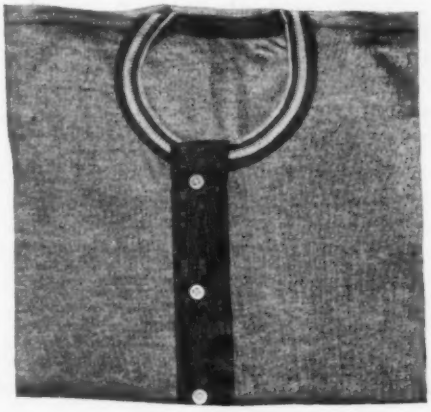


FIG. 1.

turers are complaining that the buyers are making claims that are not warranted. One case brought to the attention of the writer was over some boys' fleeced goods. It was found that while there was a slight difference in the weight, this would probably have been overlooked by the buyer, but the original samples sent out were made with white cotton fleecing, while the fleece in the goods delivered was discolored and looked as though it had been made of a mixture of clips and waste. The manufacturer's reply to the complaint was that there was nothing wrong with the goods. Nevertheless, he granted a concession of 12 1/2c. per dozen.

Another serious cause for complaint is the width of the ladies' 6 lb. ribbed goods that are being delivered and jobbers report they are having difficulty in getting customers to keep them. Manufacturers state it is an impossibility to make a ladies' ribbed garment weigh 6 lbs. and have it as wide as goods weighing 7 and 8 lbs. We are quite sure there will be so much dissatisfaction from the buyers in this particular line this season that it will be a very difficult matter to sell a 6 lb. garment again.

The wool mills are running full and prices are being maintained. On account of the firmness of raw material, some duplicates have been refused at original prices and manufacturers are having difficulty in making satisfactory deliveries.

The hosiery end of the market at first glance shows very little change, but what has taken place, has been in the shape of a slight improvement. Spring lines are slow in moving, only fair orders have been placed and the indications are that buyers are waiting further developments before covering their entire needs and the agents' consolation is that

FIG. 2.

even with a moderate demand, liberal duplicate orders will have to be placed.

High class goods have sold well, garter tops in both lisle and lace are in demand. Tan goods in medium to dark shades are being selected freely and laces up to the 50c. grades promise to be good sellers another season.

CHEMNITZ REPORT.

There has been little change in the market during the past three weeks. The demand for staple hosiery is about the same as it was at the time of our last issue. Split soles are selling well and the demand for ingrain goods has been larger than in former seasons

and it is said that a great many numbers are in the market on which there is scarcely any margin for the manufacturer, so that an advance in this class of goods is looked for shortly.

All maco feet are not selling as well as in former seasons, the demand for these having given way to some extent to three-quarter maco feet.

Lace hose are in great demand, but as the production is extremely large, chances are there will be no advance in prices, unless much larger orders are placed than are in the market now. There are few new designs shown in either boot style or all-over lace, but as all manufacturers have a great variety of patterns, it is an easy matter for importers to make up new lines which they have not had before.

Striped hosiery are not selling in ladies' goods, but for men's wear are bought to a certain extent on plated grounds. Nearly all fancy goods shown for ladies are small, neat, hand-embroidered designs, there being little demand for large patterns. In very low priced goods machine embroidered effects are shown, but are selling slow.

Extracted styles are being taken well in ladies' hose up to the $1 limit, but only in small quantities in higher priced goods.

Printed goods are selling only in the low grades.

The glove trade is not very satisfactory up to the present time and aside from the low priced Berlin gloves, business amounts to a very small proportion. Prices are lower than last year, although material costs more. Wages for glove makers are at a very low level and buyers can place their orders now at very satisfactory prices. Several manufacturers have stock lots of silk gloves on hand, but mostly in the low priced goods.

The one clasp goods bought last season did not prove to be as salable as expected and for that reason are not taken up much for this coming spring, two clasp goods having the preference.

There were no weaving mills in the United States until after 1817. All the cotton yarn spun previous to that time was put out to families and woven on hand looms.

ANALYSIS OF KNITTED FABRICS.

BY LAFAYETTE.

Manufacturers of hosiery, and also of underwear, are frequently asked by their selling agents to duplicate a stocking or an undershirt, and numerous trials and experiments are made before the exact fabric of the same gauge and weight per dozen is obtained.

In hosiery it is much easier to analyze a stocking and ascertain how many needles were in the cylinder on which it was made, and the size or number of the yarn used, as the stitches can readily be counted and the yarn weighed.

In the case of ladies' seamless hosiery, the only point that cannot be positively determined is whether the cylinder used was a 3 3/4-inch diameter or a 4-inch. Some manufacturers use the former size, and others the latter. The gauge of the stocking is almost identical in both cases, thus making it very difficult to say on which size the stocking was made.

Again, the builders of hosiery circular machines have different ways of measuring their needle cylinders. Some measure them by taking the outside circle of the needle cylinder, others take the measurement from back to back of the latch needles when in the cylinder, and call that the diameter of the machine.

It will be thus seen that by the latter method a 3 3/4-inch machine will be practically the same as the 4-inch diameter measured the former way.

Those who have adopted the latter method say that the depth of the slots cut in the cylinder should be deducted from the diameter of the cylinder, thus leaving the calculation of the number of needles to the inch of the circumference to be more accurately ascertained.

In underwear the most difficult point to determine is the gauge on which the garment was made. The reason for this is that by using a finer yarn, say on a 26 gauge, and finer needles than 26 gauge needles, the gauge can be made to look as fine as 28 or

even 30 gauge, on which the yarn used had been as heavy as the last mentioned gauge would permit.

The weight of the goods made on 30 gauge, with a heavy or coarse yarn for the gauge, would be heavier than that made on the 26 gauge with a finer yarn for the gauge, and that made on the 26 gauge would look as fine in the gauge as that made on the 30 gauge.

To demonstrate further this difficulty of determining the gauge, would say, I have known cloth to be made on 22 gauge that looked as fine as that made on 26 gauge, and the weight per dozen of goods was exactly the same. This was accomplished by taking the 26 gauge needles and casting them in the 22 gauge mould. In order to have the cloth the same width as the 26 gauge, a cylinder 2 or 3 inches larger in diameter was selected, or one that would contain about the same number of needles in 22 gauge as was in the 26 gauge cylinder, and in drying the cloth, it was dried the same width as the 26 gauge cloth. Yarn of the same size was used on the 22 gauge as on the 26 gauge, and the knitted cloth was identically the same as to the appearance of the gauge, and also as to the weight.

It follows, therefore, that to duplicate a knitted shirt so as to get the same gauge and the same weight per dozen, the first thing to ascertain is the number of needles around the shirt next, its width, and next, the number of the yarn used, and lastly, the number of stitches per square inch, which can be counted by the use of a magnifying "stitch" glass. This "stitch" glass is the same as the "pick counter" used by weavers for counting threads to the inch on woven goods. They are made 1/4, 1/2 and 1 inch square.

Even after the number of needles and the size of yarn used have been ascertained, the most important point, in order to produce the same weight per dozen of goods, is the "stitch," or the number of stitches per square inch, as the more stitches to the square inch, with the same number of yarn, the heavier the goods per dozen will be.

Again, the stitch in a ladies' seamless stocking is made shorter, and more stitches to the square inch are inserted in the ankle and foot part than in the upper part of the leg. As the stitch in full automatic hosiery machines is automatically shortened for the ankle and foot, this is the best place to ascertain the number of stitches per square inch. This shortening of the stitch in the ankle part is done for the purpose of making it narrower at that part, and thus helping to shape a seamless stocking.

In full fashioned hosiery, the stitch is not shortened, but remains the same, the stocking being narrowed on the machine, on each side of the selvage edges, from the lower end of the calf down to the ankle, hence the term full fashioned.

To duplicate a stocking, measure carefully the length of leg, including heel, and also length of foot.

Then count the number of stitches to the square inch, both vertically and horizontally, through the magnifying stitch glass.

Next count the number of stitches around the stocking, which will give the number of needles in the cylinder.

Next, cut off enough of the leg of the stocking and proceed to unravel same, and wind for 120 yards on a yarn reel, being careful to have sufficient tension on the unraveled yarn in winding it on the reel, to take out the kink or curl made in the yarn in knitting.

This 120 yards of yarn is then weighed on a grain scale.

Now divide 1,000 by the weight in grains and the quotient will be the number of yarn by the cotton system.

For example, if the weight is 50 grains, the number of cotton yarn is (1,000 ÷ 50 =) 20s.

If worsted yarn, divide 1,500 by the number of grains. In the above example the count by the worsted system would be (1,500 ÷ 50 =) 30s.

Thus, if a manufacturer is using a number 20s cotton yarn, and desires to make the same weight of stocking in worsted yarn, he would use a 30s worsted yarn.

Take another example, in which the weight of 120 yards is 83 grains, 1,000 ÷ 83 = No. 18 cotton.

To duplicate an undershirt, measure carefully the width and length of body, also length of sleeves and cuffs. Then count the stitches in the circumference to determine the gauge. Multiply the width of the shirt in inches as measured across the double fold by 3 1/7, to find the circumference of the circular fabric. Divide the number of stitches by the number of inches thus obtained and multiply the quotient by 1 1/2 to determine the gauge, which is the number of stitches in 1 1/2 inches.

For example, we will say an undershirt which is called and marked 40-inch should measure 40 inches around, or as measured on the double fold 20 inches in width. This measure across usually represents the diameter of the cylinder on which the shirt was made, therefore the circumference is equal to $20 \times 3\ 1/7 = 62\ 6/7$ inches.

There are about 1,000 stitches in the circumference. $1{,}000 \div 62\ 6/7 = 16$. $16 \times 1\ 1/2 = 24$, gauge.

Take another example: 44-inch shirt measures 22 inches across. $22 \times 3\ 1/7 = 69\ 1/7$. The number of needles is about 1,014. $1{,}014 \div 69\ 1/7 = 14\ 2/3$. $14\ 2/3 \times 1\ 1/2 = 22$ gauge.

The number of the yarn is ascertained in the same manner as with hosiery, by unraveling, and reeling off 120 yards, and finding its weight in grains.

Having ascertained as nearly as possible the gauge and the number of yarn, use the size of cylinder that will contain the number of needles of the indicated gauge. As in the hosiery, have the same number of stitches per square inch as shown by the use of the magnifying stitch glass, and the shirt will be duplicated as to gauge and also as to the weight of the goods per dozen.

Different weights of goods can be made on the same gauge, with the same number of yarn, and the same number of stitches, by making the stitch longer or shorter. This shows that the question of "stitch" in knitting is very important as regards weights.

In plated hosiery or underwear made of cotton and worsted yarn the size of each kind of yarn is ascertained in the manner already explained. The percentage of each kind of material can then be readily calculated.

For example, if the cotton number used is 20s and the worsted number 30s, these two being equal in weight and size, there would be 50 per cent. of each material. If the cotton number is 20s, and the worsted number 18s, there would be 62 1/2 per cent. worsted and 37 1/2 per cent. cotton.

A MACHINE FOR HANDLING TUBULAR FABRICS.

An invention recently patented in this country for handling tubular fabrics is thus described by the inventor.

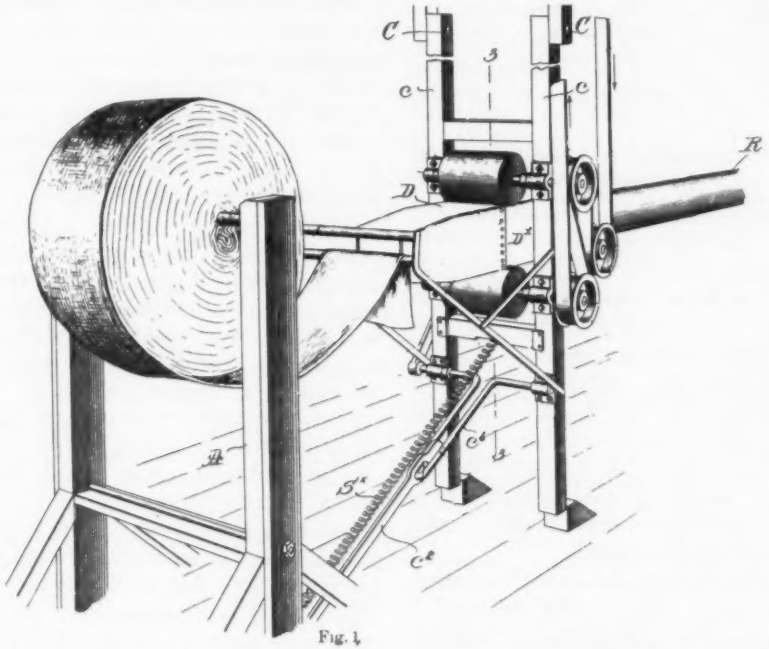
Knit fabric is made in great quantities in tubular form to be subsequently cut longitudinally and form a flat web from which undergarments, etc., are made, and it is common practice to subject the fabric to various treatments while in tubular form, such as washing, napping, etc. After one side of the cloth has been acted upon the tube is turned inside out to expose the other side for treatment. In order to turn a long piece of tubular fabric, it is the usual practice to draw the same on a tubular support or receiver by manual labor, the operatives drawing the fabric and pushing it together until many yards may be pushed and drawn on a support fifteen or twenty feet long. Then the fabric is drawn over one end of the receiver and pulled through it, thus turning the tube of fabric inside out. The manual operation of drawing or fulling the fabric on the receiver is tedious and requires the operators to pull on a quantity and then push it along the receiver, then pull on more and push it along, and so on, until the whole length of the web is on the receiver.

This invention has for its object the production of simple and effective mechanism for rapidly and easily placing a tubular web on a receiver as a preparatory step to turning the web inside out. It is adapted for any tubular fabric which for any reason must be turned inside out.

Fig. 1 is a perspective view of an apparatus for handling tubular fabric and embodying one form of the invention, the tubular web being shown in readiness to be applied to the apparatus, the drawing being broken out at the upper part to economize space.

Fig. 2 is an enlarged longitudinal section on the line 3 3, Fig. 1, through the centre of the apparatus.

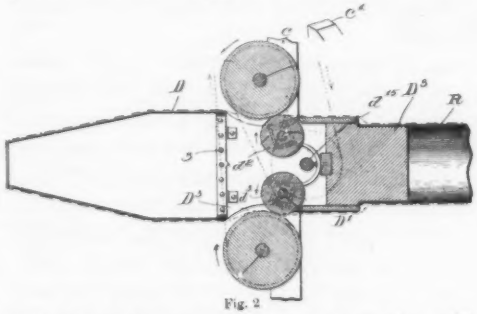
In Fig. 1 one end of the tubular receiver, R, is shown, made of metal and supported in any suitable manner. Near one end of the receiver is a frame, A, secured to the floor



and on which is mounted the fabric to be treated, loosely rolled up for convenience in handling.

The operator takes the free end of the tubular web, opens it out and draws it on the tapered end of the spreader and over the main portion, D, drawing the thus-distended fabric far enough to introduce the leading end to the nip of the two pairs of rolls. The belt is then started and the nip of the feed-rolls on the exterior face of the web is maintained by the yielding outward pressure imparted to the presser-rolls, d^2d^3. The feeding is effected with great rapidity and uniformity, the web piling upon the receiver as it is fed thereto, so that a web of many yards in length can be quickly and easily applied. The toggle, c^2 c^4, is now broken so that the spring, S^x, will move the swinging support away from the receiver, drawing the boss, D^3, out of the end of the receiver. The fabric on the receiver can then be turned inside out in the usual manner.

A shaft, Fig. 2, is extended through the body, D^1, near the inner end of the boss, D^3, the opposite ends of the shaft projecting beyond the body and entering holes in ears, d^{16}, secured to the uprights, c, of the swinging frame, thereby to connect the body and spreader to the support, while permitting a



slight tipping movement of the body, which tipping is necessary when coupling or uncoupling the body and the receiver.

The first patent for artificial silk was granted in 1885.

GREASY NEEDLE MARKS.

Editor Textile World Record:

It was with much interest that I read the item about greasy needle marks in your September issue. Inasmuch as I was at one time bothered by this same trouble, and having after much hard work, finally overcome the difficulty entirely, I will, for the benefit of others who are worried over this trouble, give the cause and remedy of this annoying condition.

About two years ago I was manufacturing infants' fine worsted stockings, knitting them on 7/8 automatic machines. The goods were required in bleached white, and delicate shades, as well as in black, and I was continually annoyed by greasy needle marks appearing, especially across the fabric where half the needles had been lifted preparatory to knitting the heel and toe. After trying many ways to remove these marks, all of which were failures, practically speaking, either on account of the expense, or because the required rubbing would felt the cloth, or both, I finally decided to try to prevent the streaks from forming in the first place.

Experimenting in this direction, I cleaned the cylinders and needles with benzine, I washed them in hot soda water, I brushed them and wiped them and worked over them for hours. I oiled the cams with vaseline and with stainless oil, or left them without any oil or grease of any kind, only to be disappointed in the end.

Then I began reasoning with myself as to what was the cause. Why did the streaks appear from the needles which had been periodically raised above their normal position, and not so much from the same needles when they were doing ordinary straight knitting?

Finally I came to the conclusion that in the ordinary straight knitting the greasy substance was distributed over so great an area of cloth, each series having taken a little of the stain, that it was not noticeable, while, on the other hand, when the rear needles were lifted above the ordinary position a section of the needles came into play which had not been continually wiped by passing loops, and these deposited the bulk of their stain upon the loops at one time.

Acting upon this conclusion I arranged the cams so they would lift all the needles to their uppermost limit immediately after they had been passed by the stitch cams, and provided means to lower them again to enter the stitch cams, so each revolution would place the needles to their highest as well as their lowest possible position.

This experiment proved successful, as it distributed the stain in very small invisible particles over a great area. It was not satisfactory, however, because it required so much additional motion of the needles.

After studying deeper I theorized that there could be no grease or stain on the upper portion of the needles, provided the needles did not slide between guiding surfaces at the place which was required clean. Surely a needle or a portion of a needle which did not come in contact with anything excepting the surface of the yarn it was knitting could not become soiled.

If I could take out the needle cylinder, put it into a lathe, and turn off the wings, or ridges between the needles for a space beginning 1/8 inch from the top of the needle cylinder, to a line drawn around the needle cylinder, 1 1/8 inch below, or 1 1/4 inch from the upper edge of the needle cylinder, and reduce the diameter of the needle cylinder in this zone so it would be less than the diameter from bottom of groove to bottom of groove, I would then have a space through which the needles could travel without pumping grease, or becoming soiled as they would have no contact.

As my needle cylinders were of peculiar construction, having two grooves cut around their periphery to contain two annular coiled springs for giving friction to the needles, I found that by turning out as proposed, there would be nothing left to hold the springs. The sinker cap, too, was fastened against the outer edge of the ridges which I wished to turn away, at four equidistant places, by means of set screws, so instead of turning away all of the ridges within the proposed zone around the needle cylinder, I cut out all excepting such as were required to hold on

the sinker cap. Those remaining were sufficient to hold the springs in place. This plan worked perfectly, and from that time on there were no more greasy needle marks.

From my experience I drew these conclusions: First, it is better to prevent the greasy needle marks than to make them and then remove them. Second, it is possible to prevent them by removing the cause, and third, the cause is wrong construction of the machine, which fortunately can be made right with very little work.

BERNARD T. STEBER.

FOREIGN TRADE IN KNIT GOODS.

The American consul at Chemnitz, Germany, reports the following as the substance of statements made to him in conversation by a German importer:

The introduction of American textile products into Europe has slowly but surely increased during the past years, and will increase more rapidly just as soon as American manufacturers and exporters make up their minds to pay more attention to the wants of the European markets. The American has given too much attention to the home trade, and in doing so has neglected to study the wants of the markets on this side. When Americans decide to give these markets the attention necessary there will be a greater field open to them.

In all my experience I have never found manufacturers and exporters as careless about their correspondence as are the Americans. Of course there is a reason for this, viz., they have so much to do at home; but the time will come when they will have to devote more time to foreign markets, and the sooner this is done the harder it will be for us Germans to compete with them in the markets of the world. If a German manufacturer or exporter appointed an agent in any part of the world to sell his goods the first thing he would do would be to instruct him regarding prices, payments, discounts, etc., and he would answer his letters by return post even if he had to neglect his home correspondence for a time. This the American neglects to do. For example, in sending out samples price lists are inclosed if desired; a "miss's" hose, size 9 1/2 is given, while a 9 1/2 is not a "miss's" but a lady's hose; prices are put down in dollars without any explanation whatsoever; one is always in doubt whether the price given is for a certain size or for the average size, or for each and every size. (This last holds true if the buyer orders a large assortment which contains about an equal number of dozens of large and small sizes. This is understood by all men in the business.)

Such conditions have a tendency to make business difficult and at the same time very materially to affect the faith of the foreign purchaser of American goods. They are due to the fact that the American manufacturers and exporters have too little time to give to foreign buyers, and for this reason they lose a large part of the foreign trade. They will have to come to it, however, and the sooner they take time to make a study of what the foreign markets want and the way they want it the greater will be their opportunities for getting and holding foreign trade. If German manufacturers and exporters were to pursue the American methods with regard to foreign trade it would not be long before their export trade would come to a standstill. It is due to attentiveness to detail and looking after the wishes of foreign buyers that Germany is in a position to compete with the nations of the world in all markets.

Again, every manufacturer of hosiery in the United States limits his products to a few numbers, so that it would be an easy task to give full instructions. Take, on the other hand, the smallest German exporter, and see the trouble he has to instruct his representatives (for German exporters have thirty and more representatives at the same time). Every collection contains at least 100 numbers, which must be replaced each year by new qualities and designs. American manufacturers do not need as many agents, but the few they have should have full and complete instructions. It would be an excellent idea for several American exporters who really wished to extend their foreign trade to join and have their European representatives go to America, so that business matters might be talked over on the spot, say, four manufacturers, at $150 apiece. The expense would be relatively small, and in this way things could be talked over and matters settled which would take too long by correspondence. Manufacturers here think that when American business men decide to do anything money is no object, but this is not so, for, as regards expenses and samples, they are not at all liberal. If these manufacturers only knew how many collections were sent out gratis by German exporters they would not be so careful of their samples. As for sending out samples to markets unknown to them, it is not to be thought of.

All these are difficulties which an agent of an American textile manufacturer must overcome little by little. It would be of inestimable benefit to both if the manufacturer would try to meet his agent halfway and arrange everything satisfactorily so as to avoid loss of time.

Then, again, the American should try to win his customers, for it is generally believed here that goods delivered cheap are not at all up to samples. It is very easy to see that manufacturers should give the first trial orders, which are never less than two cases, and very often more, the most careful attention, and see to it that the goods delivered are in every respect the same as the samples. It is clear that if these first orders are carefully looked after a large business may be done. Customers have declared on giving trial orders that they can use from ten to fifteen times the quantity ordered if the goods turn out as good as the samples.

One great difficulty for the agent is the persistency with which the Americans stick to their qualities. A German manufacturer always tries to get up new designs, and imitate all goods competing with his if he can get hold of them. This the American does not do; he merely sticks to his old numbers. In most cases it seems the desire is wanting to get up something new or he does not

understand how. He lacks the wish to accustom himself to the wants of his customers.

Some of the evils have been removed with the help of the Government, which is doing everything in its power to help exporters.

As regards American goods in the European market, only three numbers come properly into consideration, viz., two qualities of hosiery and one quality of gentlemen's underwear. In Germany the one quality of underwear is salable only to retailers. The principal hindrance to placing American underwear on the German market is the high duties, which amount to 95 pfennigs (22.6 cents) for 1 kilo (2.20 pounds). As American manufactures are almost without exception fine articles, the duty makes quite a difference in price. However, in spite of this, the better numbers of underwear, especially those with worked borders, can enter into competition with German goods, as they can not be produced in Germany at the same price. In Germany retailers buy this class of goods in the Orient wholesale houses. In the Orient a large business can be done.

In women's and children's hosiery, ribbed goods in two weights are mostly sold. In Germany this class of hosiery can not be sold on account of its weight. In other countries, however, where there are no duties or where the duty is the same on German and English goods, there is a great demand. A number of orders for seamless hosiery have also been received, but no large orders up to date.

The best way to get hold of the European market would be for the largest and best American manufacturers to go into this business seriously and to spare no pains to attain this end. Every beginning is hard, but even if the results are at first not apparent and the profits scarcely cover the outlay, later years will bring the reward.

Exports of Foreign Knit Goods.

Editor Textile World Record:

A recent report from the American consul at Chemnitz refers to American knit goods in Europe. Will you inform me to what extent the United States is exporting knit goods?

Richfield (464).

A merchant who is well informed regarding the domestic and foreign markets for knit goods answers the above question as follows:

I believe that the only American hosiery sent to Europe is the coarse 84-needle half hose sent to Sweden, Norway and Italy. Some one in Chemnitz has an agency for this class of goods and sells it to buyers who come there from the above mentioned countries, also to buyers from Egypt, Smyrna, and in fact, all Asia Minor. It is only the very lowest grade stuff and must necessarily be goods on which there is practically no labor cost.

Fillmore.

Night Work.

Is night work advantageous to a mill, or would it be more profitable to increase the plant and confine the operations to one shift of 10 hours?

Canoga (467).

A mill manager answers this question as follows:

Assuming that Canoga means working all night, I answer that it is not advantageous.

I infer that the question refers to a knitting mill in which the large majority of help is females, which again is a disadvantage in running all night work. Women, as well as men, find it very difficult to get the proper hours of sleep in the daytime. Even in places where only men are employed on night shifts it is found necessary to change them every week or every two weeks from the night to day shifts to give them an opportunity to recuperate.

Help working at night without having had the necessary rest or sleep are unable to do as good and efficient work as in the day time. I tried the experiment myself for nearly two months in the knitting department alone, and while the night work of itself was a success and profitable, and the proper production of the machines was kept up, the production in the daytime fell off 30 per cent., and after the novelty wore off the girls got tired and dissatisfied and so I discontinued it.

I made all preparations for running the night work several weeks ahead, by training new help and using the older and more experienced hands for night work. This was an additional expense beforehand, and while, as already stated, the production at night was up to the standard, that in the daytime was less than formerly, so that part of what was gained by night work was lost in the daytime. In order to get the women to work at night, extra inducements in the way of more wages had to be paid.

I have known of two other mills in which the knitting departments were run all night for a long time, and where it was thought profitable to do so. I think otherwise. In one mill, in order not to have the females working at night, they wound a large quantity of yarn on extra bobbins, and engaged three or four young men, paying them $1.75 a night, whose duty it was to knit up all the yarn that had been wound. There were more than enough knitting machines to do this. In order to get all the yarn knit up by 2 or 3 o'clock in the morning, and then lay down and sleep, these young men would start running more machines than it was possible for them to watch properly, with the result the machines would smash up and be put out of order. Then they would start up others in

their places so that as many as four and five machines would be out of order in the morning. Sometimes one or two would have all the needles broken.

The production from these machines in the day time was thus reduced. The cost of the broken needles, and the extra labor of the boss knitter in putting them in working order again had to be taken into account.

Overtime to 9 or 10.30 P. M. can be successfully run for three or four months at a time under certain conditions, but here also it will be found that if the same help is used for the overtime every night in the week, that after a short time they get tired out, so that the usual day's production would be less.

From experience I find that you can work the same help overtime for three nights in the week to 9.30 P. M., or every alternate night, and keep up the standard of production, and also get the extra production for the hours of overtime, but this is the most that can be profitably done.

If it is desired to run overtime every night in the week, and the mill is in a place where other experienced help could be obtained who were employed daytimes only, and these could be engaged to work three nights in the week on the other alternate nights, then it would be profitable to run the machinery overtime every night, but in no other way can night work in a mill employing mostly females be advantageous. The owners might better enlarge the plant and keep entirely to the usual day of 10 hours.

Esek Easton.

Management of Help.

Editor Textile World Record:

In your September issue Sacramento asks what is the best method of securing efficient service from the operatives in knitting mills. The article written by Noel Howe on this subject is A1 in every respect. For more than sixty years I have been employed in knitting mills, holding all positions from overseer to manager. For the last thirty years I have been a superintendent and I fully endorse Mr. Howe's principle of leaving each department to its overseer or foreman and holding him personally responsible for it. Human nature is about the same wherever you go and in my experience in the knitting mills in various parts of this country and in Canada, I have always found it best to leave the overseer in each department in full control of the help under him. If anything of a serious nature should occur, as is frequently the case, the overseer should talk the matter over with the superintendent and the matter can then be adjusted to the satisfaction of both parties.

My thanks to Mr. Howe for the light he has given on the subject.

Old Superintendent.

Drop Stitches.

Editor Textile World Record:

In knitting Richelieu rib and 2x2 I am troubled with occasional drop stitches from the cylinder needles. How can the machine be adjusted to stop this trouble?

When knitting lace stitch goods by the use of long-latch dial needles, I find that the cylinder needles just preceding the long-latch needles are very apt to drop stitches. The same machine will knit 2x2 perfectly. What is the remedy?

Ronan (466).

An expert expresses the following opinion as to the cause of Ronan's difficulty with drop stitches:—

I believe the trouble is due to the fact that the guides are either too close to the needles or too far away. In the event of them being too far away, the guide will fail to place the thread safely under the hook. In the event of the guide being too close, it will jam the thread between the guide and the cheek of the needle, thus feeding down the thread prematurely between the needles just landing the stitch and the ones to take the thread. This is one of the causes of drop stitches.

In the event of the cylinder needles dropping stitches just preceding the long latch dial needles, the only remedy for this is to grind the draw-down-cam, slightly rounding it at the bottom, so as to avoid the needles being placed in a lower position than the actual depth of the cam by velocity. This may be the cause of the trouble.

Recent Knitting Patents.

HOSIERY. Seamless. 770,231. George H. Gilbert, Germantown, Pa., assignor to the Kilbourn Knitting Machine Co., New Brunswick, N. J.

KNITTING MACHINE Embroidering Attachment. 768,093. Edouard R. Thierfelder, Kenosha, Wis.

KNITTING MACHINE Fabric Slitting Device. 770,633. Henry W. Folsom, Lowell, Mass., assignor to McMichael & Wildman Mfg. Co., Norristown, Pa.

KNITTING MACHINE Stop Motion. 769,378. William Hammond, Germantown, Pa.

KNITTING MACHINE Thread Changing Mechanism. Circular. 768,279. Emil A. Hirner, Allentown, Pa.

KNITTING MACHINE DIAL ADJUSTMENT. 766,041. Leon C. Huse, Laconia, N. H., assignor of two-thirds to Warren D. Huse and Walter L. Huse, Laconia, N. H.

KNITTING MACHINE STOP MOTION. 766,305. Frank Wilcomb, Norristown, Pa., assignor to H. C. Coleman, Norristown, Pa.

KNITTING MACHINE STOP MOTION. 766,306. Frank Wilcomb, Norristown, Pa., assignor to H. C. Coleman, Norristown, Pa.

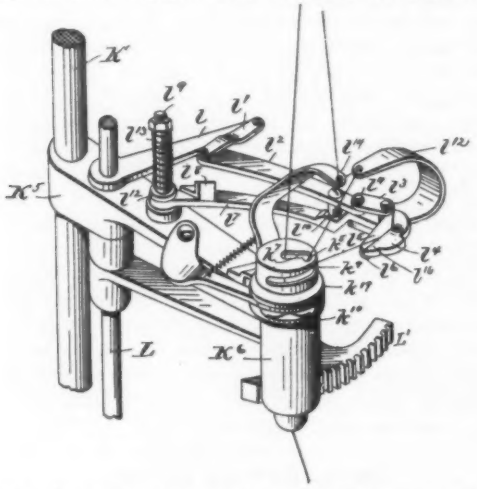
KNITTED FABRIC. 765,941. Charles J. Sibbald, Troy, N. Y., assignor to Charles Cooper, Bennington, Vt.

KNITTING MACHINE. 12,251. (Re-issue.) Daniel F. Sullivan, Lowell, Mass., assignor to Lawrence Mfg. Co., Lowell, Mass.

KNITTING MACHINE. 12,256. (Re-issue.) Robert W. Scott, Philadelphia, Pa., assignor of one-half to Louis N. D. Williams, Ashbourne, Pa.

KNITTING MACHINE. 765,043. James E. Rowe, Pawtucket, R. I., assignor to The Jenckes Mfg. Co., Pawtucket, R. I.

In hosiery knitting machines it is desirable to use an extra thread on the heel and toe and it is



the object of this invention to provide a mechanism which shall be simple in construction and positive and accurate in action for inserting and withdrawing the extra thread at the proper time. From the drawing it will be seen that the extra thread is carried into engagement with and wound one or more times about the main thread, and its accurate insertion insured, and that this extra thread is held out of engagement with the main thread after its withdrawal and until it is to be again inserted.

STOCKING SOLES MANUFACTURED ON CIRCULAR KNITTING MACHINES. Mechanism for Forming Double Threads upon. 761,632. Harry A. Houseman, Philadelphia, Pa., assignor to Philadelphia Machine Co., Philadelphia, Pa.

R. M. Oates Now with E. Jenckes Mfg. Co.

Messrs. E. Jenckes Manufacturing Co. of Pawtucket, R. I., announce that Mr. R. M. Oates has been engaged to represent its interests in the South in the sale of the "Invincible" full automatic knitter, and his headquarters will be at Hendersonville, N. C. Mr. Oates has previously represented this company in the Southern field, is thoroughly familiar with its line, and is widely known in the knitting industry.

A Fancy Knitting Mill.

The Wisconsin Knitting Mill Co., have recently established at Manitowoc, Wis., a thoroughly up-to-date knitting mill equipped with the latest machinery for the manufacture of novelties in knit goods, such as sweaters, cardigan jackets, golf goods, etc. E. H. Ludwig, an experienced knitter, is the manager. Mr. Ludwig went to Germany in February and bought the latest and most improved machinery for fitting the Manitowoc plant, which he is confident is equal to any mill in this country or Europe. The mill is provided with ample capital. The machinery is run by electric motors, the current being generated by steam engine and dynamo on the premises. The mill starts under the most promising auspices on a line of goods which are now very popular.

KNITTING MILL NEWS.

New Mills.

Alabama, Gadsden. Work is now under way remodelling the old ice plant for a knitting mill. New machinery will be installed for making knit undershirts. Plant will have capacity of 200 dozen shirts per day. R. L. Adams is largely interested in the enterprise.

*Connecticut, Putnam. John F. Brooks will be president of the Putnam Knitting Mills, to be established here and which is a consolidation of the Home Knitting Mills (Boston), and Brunswick Knitting Co. (Brunswick, N. J.); Robert G. Harris, treasurer, and Geo. E. McCann (Auburn, Me.), secretary. They will start manufacturing as soon as the machinery has been placed in position.

New Jersey, Little Falls. Mr. George Jackson, proprietor of Jackson's Park Scouring Mills, is about to start up the Lotus Knitting Mills with 30 knitters on 156 needle goods. The mill is to be located in one of the buildings formerly used for wool scouring.

New York, Kinderhook. Operations will soon be started in knitting mill to be known as the Elk Knitting Mill.

*North Carolina, Monroe. The Crow Hosiery Mill Co. has begun operations in their new plant. Company has capital stock of $25,000 and plant equipped with 42 knitting machines for making boy's and misses' ribbed hose. R. A. Morrow is president of the company; J. J. Crow, treasurer and H. E. Wilson, agent and superintendent. A dye house is attached to the mill, operated by steam.

Ohio, Cleveland. The Friedman-Blau-Barber Company has been incorporated with capital stock of $300,000 by A. J. Farber, Max J. Farber, W. S. Blau and I. Whitelaw. Work will begin shortly on erection of a large factory for manufacturing knit goods.

*Pennsylvania, Bath. D. J. Odenwelder will start operations in his new mill, January 1st, 1905. He will manufacture women's very high class hosiery, operating 25 machines and selling goods direct.

Pennsylvania, Glen Riddle. It is reported that Samuel B. Rhodes of this place has leased a building in which he will instal a hosiery plant, with capacity of 125 dozen daily.

Pennsylvania, Philadelphia. The Beattie Hosiery Company has been started up by Charles Beattie and Alexander Beattie at 2420 Waterloo St., for the manufacture of flat, ribbed and all kinds of ladies' hosiery. The company has nine "Victor" machines in operation on samples and are about to order several others and a drying machine. When the plant is in full operation they expect to manufacture about 100 dozens a day, the goods being dyed outside and sold direct. Alexander Beattie, formerly boss knitter at Chas. Chipman's Sons', Easton, Pa., will have charge of the plant as superintendent.

Pennsylvania, Philadelphia. A hosiery mill is to be established at Franford by James Lenox, formerly with the Vigilant Hosiery Mills.

Pennsylvania, Philadelphia. The manufacture of sweaters, etc., is about to be started by Frederic Burghausen, 421 Fairmount Avenue. One machine has already been ordered from the Grosser Machine Co., in Germany, and another order will follow as soon as the first machine is received.

Pennsylvania, Philadelphia. The Mascot Hosiery Co., which recently disposed of plant to the Narragansett Knitting Company, has changed name to the Mascot Knitting Company. They will manufacture hand knit goods.

*Pennsylvania, Pottsville. The new plant of the Auto Knitting Mills is equipped with 20 knitting machines, 3 ribbers and 4 loopers for making hosiery and underwear.

*South Carolina, Westminster. Work will start about October 1st on erection of the new building for the Westminster Knitting Mills, which have been incorporated recently with capital stock of $20,000. W. P. Anderson is president and treasurer of the company. Have not yet decided whether hosiery or underwear will be made. Will have an equipment of from 40 to 50 machines and expect to have the mill running by March 1st, 1905. A dye house will be attached.

Enlargements and Improvements.

*Illinois, Chicago. Friedlander, Brady & Co. expect to have their new building, upon which work will start in November, ready for occupancy about April 1st, 1905.

Indiana, Fort Wayne. An additional story is being built to the Wayne Knitting Mills, increasing the floor space 12,500 square feet. They will instal some additional machinery.

*Massachusetts, Northampton. Work is under way on addition to the McCallum Hosiery Co.'s mill. A dye house is to be installed in the plant.

Massachusetts, Springfield. An addition, 60 by 60 feet, two stories, is to be built to the McCallum Hosiery Company's plant.

*Massachusetts, Waltham. The Boston Manufacturing Company has resumed operations.

*New York, Cohoes. The Wright's Health Underwear Co., of Troy, has leased the Mohawk River Mill and will start next week operating same. The mill will be enlarged and improved.

New York, Johnstown. The Johnstown Knitting Mill has been closed for two weeks. A new drying plant will be installed to meet demands of increased business.

New York, Utica. Work will soon start on erection of a large warehouse, 120 by 100 feet, three stories, for the Utica Knitting Company, manufacturers of hosiery and underwear.

Ohio, Bowling Green. The Superior Manufacturing Company and the Superior Underwear Company will soon be located in a new large brick block. Their respective plants were damaged by fire.

Ontario, Toronto. The Enterprise Hosiery Company's machinery at Toronto Junction has been purchased by Joseph Simpson Sons, who have installed it in their mill.

Pennsylvania, Ashley. A new building, in which additional machinery will be installed, is to be built by West Bros., manufacturers of hosiery.

Pennsylvania, Bridgeport. The Kaufman Company's mill has been closed for purpose of making repairs to the boilers.

Pennsylvania, Norristown. Work has been started on erection of an addition, 60 by 40 feet, three stories, to the Star Knitting Mills, Lewis E. Taubel, proprietor.

Pennsylvania, Philadelphia. The Elk Knitting Mill, Fretz Building, 10th and Diamond Sts., manufacturers of ladies' and children's ribbed underwear of silk, lisle and cotton, worsted and merino, on 50 knitters and 40 sewing machines, report that the demand for their goods, which are of the highest quality, has compelled them to increase their production for the year 1905 by 25 per cent. The plant is run by electricity and the goods sold direct. The company has a capital and surplus of $75,000. Harry Nelke is president and Herbert L. Nelke, treasurer of the company.

Pennsylvania, Manheim. New machinery has been installed in the Manheim Hosiery Mills, increasing the weekly output to over 200 dozen.

Pennsylvania, Mifflintown. Additional machinery is to be installed in Karl & Schott's hosiery mill. Capacity of plant at present is 350 dozens per day.

Pennsylvania, New Bloomfield. An addition, 16 by 26 feet, is being built to the New Bloomfield Hosiery Mill.

*Pennsylvania, Newport. Work is well under way on an addition to H. A. Romberger's mill. Will instal 38 new knitting machines. This plant is operated on women's and children's hosiery and men's half hose.

Pennsylvania, Philadelphia. A three-story brick building, 26 by 42.7 feet will be erected by John Blood & Bro., manufacturers of ladies' ribbed underwear on 70 body machines and 40 sleevers, as an addition to their already large plant at the corner of Trenton and Allegheny Aves. They also operate their own bleaching and finishing departments. The goods are sold through New York.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices, and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Oil Separator. The American Tool and Machine Co., Boston, Mass., are placing on the market an electrically driven centrifugal oil separator which is described in this issue.

Warp Stop Motion. Coldwell & Gildard Co., Fall River, Mass., are introducing a warp stop motion which has been developed and thoroughly tested in New England mills. A description appears in this issue.

Nasmith Comber. Stephen C. Lowe, 186 Devonshire St., Boston, Mass., American agent for John Hetherington & Sons, Manchester, Eng., is installing the new Nasmith cotton comber in several American mills. Three hundred and fifty of these machines are in operation in England and on the Continent, giving results, particularly on medium and short staple cotton, which it is said have heretofore been impossible. Mr. Nasmith, the inventor, is in this country for the purpose of superintending the starting of the machines and to demonstrate their capabilities to American manufacturers. An illustrated description of the new comber appears in this issue.

Refinishing Machine. The Curtis & Marble Machine Co., Worcester, Mass., have recently brought out a machine for refinishing goods that have been sponged. It is well known that the process of sponging preparatory to manufacturing cloth into garments often destroys the original finish given to the fabric at the mill. It is the object of this machine to restore this finish. This is done by passing the goods between calender rolls heated by steam.

Warp Twisting-In Machine. The Warp Twisting-In Machine Co., 309 Broadway, New York, is putting on the market a twisting-in machine originated by Albert Goss, which is the result of 14 years of continued study and experiment, during which period it has been reconstructed eight times. We are informed that it is now in regular use by a number of the foremost manufacturers in the silk industry. The model has been standardized, and all parts are interchangeable. The machine is now being adapted for use on cotton fabrics, and it is expected that it will be ready to introduce into cotton mills in a short time. The capacity of the machine in regular operation depends upon many factors, over which the manufacturers of the machine have no control, for example, condition of the warps and harnesses, the quality and nature of the material, and the skill and industry of the operator. We understand that in several mills a regular output in excess of 33,000 ends per working day of ten hours has been obtained by the mill operators without assistance from the manufacturers of the machine, and that for shorter times this rate of output has been greatly exceeded. The manufacturers have adopted rather a novel idea. They have opened a school at their offices in New York for the instruction of mill operators, and they advise us that the places in this school are taken for months ahead. A feature of this machine is its adaptability for twisting in both in the loom and out of the loom. It is being applied both to Jacquard and shaft looms. The machine is small, of about the size and approximately the same weight as a typewriter.

Encolline Sizing. J. A. Del Solar, 108 Fulton St., New York, is putting on this market a French sizing compound, which has had great success in Europe. It is claimed to impart strength to fabrics, making them elastic, compact and smooth, and it is an excellent filler. It is particularly recommended for unbleached muslin. A booklet has been published containing a number of receipts for sizing and loading.

Improvement in Warp Dresser. Jacob K. Altemus, 2818 North 4th St., Philadelphia, is bringing out a new model of his warp dressing machine. It is equipped with four drums, and has a patent release vacuum valve which prevents explosion and relieves over pressure and blow-off. Patent scoops empty the condensed steam immediately, which gives an even temperature. Another important feature is that the yarn has an air space to travel in before reaching the cylinders. There is an expansion pulley to adjust the speed in driving the take-up. All the friction wheels which the cylinders run on are equipped with ball bearings, which is an important factor in smooth running and production of power. Mr. Altemus also builds a dry warper without cylinders, which for certain purposes is very satisfactory.

Automatic Alarm for Feeders. Otto A. Bremer, Burlington, Ia., is the inventor of an alarm attachment for feeders of the Bramwell type, the purpose of which is to sound the alarm when the material in the hopper has become exhausted below a determined point. Patent and manufacturing rights are offered for sale.

Traveling Scavenger. J. Hetherington & Sons, Manchester, England, are introducing a traveling scavenger for mules, the invention of E. Lowe of the Britannia Spinning Co., Mossley. Instead of using ropes or wires the scavenger is moved by means of a light iron rack and suitable catches. To this rack a curtain is attached which keeps the carriage free from flyings.

Waste Cleaning and Spinning. Tomlinson Soho Iron Works, Rochdale, England, have recently brought out a machine for cleaning waste. It consists of a cylindrical screen holding the waste and in which a shelf carrying projecting arms revolves.

Centre Selvage Motion. J. Fairburn, Burnley, England, has brought out an improved centre selvage motion which, it is claimed, is more convenient and serviceable than the devices heretofore in use.

THE NASMITH COMBER.

This machine was patented at the close of 1901 and the practicability of its principle was first demonstrated by modifying a Heilmann comber. Pending the construction of the new machine, a few combers were built on the Heilman framing and proved unsatisfactory in detail, owing to the restrictions imposed by the framing.

The real Nasmith comber was put on the market in June, 1902, and has proved entirely successful, three hundred and fifty being at work at the present time and eighty more are on order. The makers refrained from sending the machine to this country until a couple of years' experience in the mills nearer home had convinced them that all its details were satisfactory. Mr. Nasmith is now in this country with two machines to conduct demonstrations personally in a few mills. Arrangements are being made to run them where all parties desiring to see them may do so. We are indebted to Mr. Nasmith for this description of his machine, which is believed to mark a very important step in the development of the cotton industry. The claims he makes for his comber are based, not on theory, but on the results obtained in practical operation in English and Continental mills.

The Nasmith Comber is built by John Hetherington & Sons, Manchester, Eng., for whom Stephen C. Lowe, 186 Devonshire St., Boston, is the American agent.

The advantages of the Nasmith comber may be summarized as follows:

(a) Without increase of speed, twice the production of a Heilmann comb can be obtained and the quality maintained. This means economy of floor space, power, help and repairs.

(b) It will deal with all lengths of stock from 7/8-inch to 2 inches, without abnormal waste on the shorter varieties.

(c) It makes a perfect piecing, even on the shortest stock, and the well-known cloudy Heilmann draw-box sliver is a thing of the past.

(d) The quantity of waste is easily controlled and if desired it will work with very

low waste, even on short stock, for semi-combed yarns.

(e) All its motions except those of the detaching rollers, are continuous, so that there is only one cam in the machine, which runs very quietly and with proportionately reduced wear and tear.

(f) Its mechanism and adjustment are much simpler than those of any other comber and it rarely requires resetting.

(g) There is no leather covering required on the nipper which, once set, cannot be made to touch the cylinder.

In addition to the foregoing advantages, the following details may be noted:

It occupies the same space as a Heilmann of the same number of heads and width of lap, but stands 4 inches lower. A convenience to the help.

The headstock is cast in a solid piece as seen in the illustration.

The cylinder and nipper shafts run in split bush bearings of standard size, easily and cheaply renewable when necessary.

All the nipper pivots are plain studs in cast iron bushes renewable at trifling cost.

The brush and doffer shafts can be lifted straight out behind without disturbing anything else.

The front plate extends backward to the detaching rollers, completely covering the calendar shaft.

A convenient weight-relieving motion obviates the lifting of the detaching roller weights by hand.

A selvage guide between the detaching rollers insures perfect selvages instead of trailing, ragged ones.

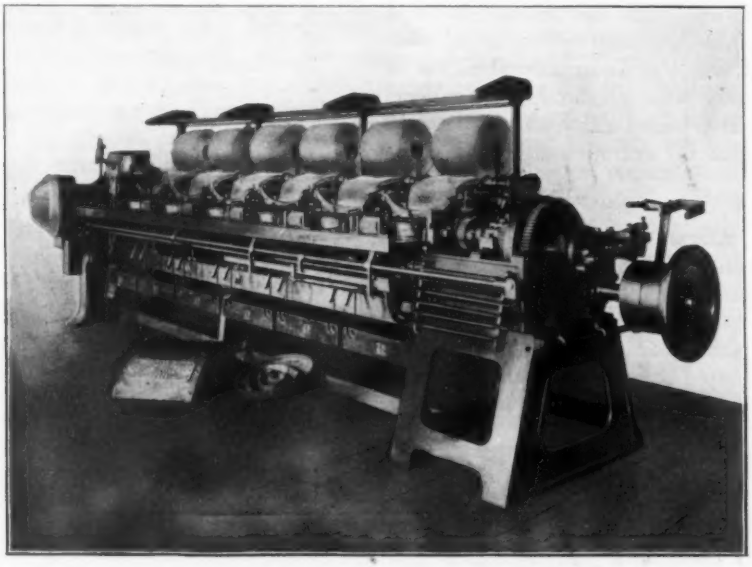


FIG. 1. THE NASMITH COTTON COMBER.

The drawing head is made with four rows of rollers.

To change from long to short stock takes less than one hour.

The work of the Nasmith comber may be classed under three heads:

1. Fine combing proper, when it does the same work as the Heilmann. In this case not more than twice the production of the Heilmann for the same quality should be attempted, and for Sea Island cotton not more than 75 per cent.

2. Medium combing where high productions and low waste may be obtained.

3. Coarse combing to take the place of super carded yarns. In this case a high pro-

duction is attained with waste from 5 to 8 per cent. The yarn must not be compared with real combed yarns, but is better than any carded yarn even when, in preparation for this combing, the card production is pushed to its limit and the card waste reduced to 2 1/2 per cent. For this class of work 1,000 pounds may be put through both card and comber weekly.

Fig. 1 shows a six-head Nasmith comber

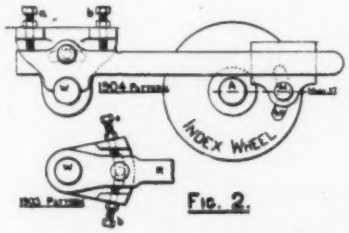


FIG. 2.

and the sectional views with the following description will make the main details and action of the machine clear to our readers. Fig. 2 shows the crank, M, on the end of the cylinder shaft, A, for rocking the nipper shaft, W. The peculiarity of this motion is the slow advance of the nipper towards the detaching rollers, allowing maximum time for this operation and the quick return. The motion of the nipper is continuous, smooth

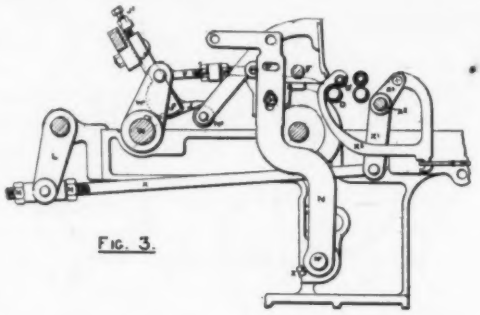


FIG. 3.

and quiet. Figs. 3 and 4 are sections showing the parts at the close of the detaching period and during combing respectively. Fig. 5 shows the details of the top comb, and Figs. a, b, and c, of Fig. 6, show the position of the parts at various points of the stroke.

The nipper shaft, W, Fig. 3, is rocked to and fro by a crank as described, and is connected to the nipper bridge, S, by the arms, W', and conecting rods, V, with adjusting nuts, V', so that the nipper jaws may be set parallel to and at the proper distance from the steel detaching roller, D. Once all the nippers are correctly set, their distance from the roller, D, may be altered simultaneously by the screws, a and b, Fig. 2. The nipper bridge, S, is bolted at each end to an upright, N, screwed to a stud, N', which rocks in a bush carried in the framing. The top nipper arms pivot on studs, P', carried in projections cast on the bridge, S. At the lower end of the arm a cross bar carries a bowl, N^5, which comes in contact with the adjustable incline, J, and opens the nipper as it moves forward. When the nipper moves back for combing, Fig. 4, this bowl leaves the incline, J, and the nipper closes under the influence of springs attached to the lower end of the nipper arms. There is no pressure on the springs when the nipper is open, but a strong pressure when

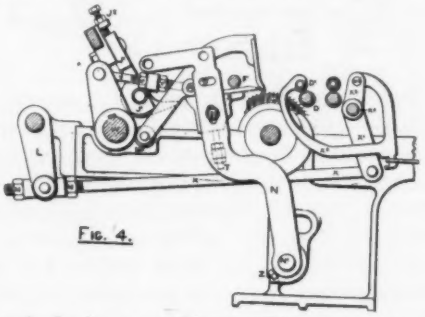


FIG. 4.

closed during combing. The opening and closing thus takes place gently and without the detrimental hammering blow observable in the Heilmann and other combers. The nipper is adjustable to the needles by set screws, T, Fig. 4, and once set is a fixture and cannot be made to touch the cylinder, as its path if continued in both directions never intersects the circumference of the cylinder.

Each nipper carries its own feed roller, F, Fig. 4, which is adjustable on the nipper plate, so that its distance from the jaw of the nipper is easily set to suit the length of the stock operated on. The roller receives its rotation from the movement of the nipper through a ratchet and pawl. The roller turns inside a stationary bush and the ratchet rocks on the outside of the bush, so there is no contact between the roller and ratchet except

through the pawl, the whole being enclosed in a casing to exclude fluff and dust. There are no change wheels, the amount of feed being altered by the simple displacement of a stud.

Fig. 5 shows the disposition of the top comb, C, which is bolted to the slot in the arms, C′. This slot and set screws, C^5, permit an adjustment of the angle of the comb within the required limits. The arms, C′, are

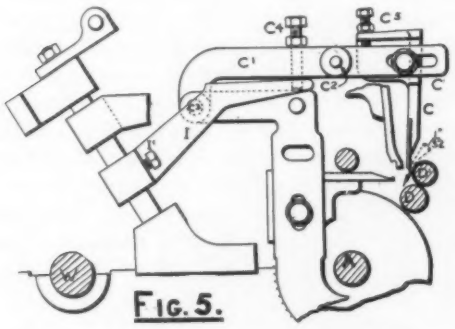


FIG. 5.

pivoted on the nipper frame at C^3, and consequently participate exactly in the reciprocating motion of the nipper. During combing the weight of the comb rests on the set screws, C^4, which regulate the depth of the comb's penetration. When the nipper goes back the bowl, C^2, comes in contact with the adjustable bar, I, and is gradually raised to keep the comb clean. Thus the raising or lowering of the bar, I, determines the moment or time when the top comb enters the fleece, and the set screws, C^4, the depth of penetration.

It will be noticed from the foregoing that the opening and closing of the nipper, the raising and lowering of the top comb and the rotation of the feed roller, all result naturally and in the simplest manner from the reciprocating motion of the nipper driven by a simple crank.

The position and action of the steel detaching roller, D, Figs. 3, 4, and 5, is identical with that of the Heilmann machine, except that the rotation of the roller continues a much greater time during each stroke in the Nasmith than in the Heilmann. The surface speed of the roller never exceeds that of the Heilmann roller, it only takes a longer time to perform its greater arc or revolution. Again the surface speed of the Heilmann roller must coincide exactly with that of the fluted cylinder and after backing off it must acquire this speed in the briefest possible fraction of a stroke. The leather roller never coming in contact with the cylinder, no such embarrassing restriction exists in the Nasmith machine and the rollers stop and start gently, the cam being designed to operate the sector just as a crank would.

The leather covered detaching roller, D′, Figs. 3, 4, and 5, never comes in contact with the cylinder but rests simply on the bottom roller, from which it receives its rotary motion, and in addition to this it receives a bodily movement to and fro, from the position of Fig. 3 to that of Fig. 4. This is obtained from the lever, L, keyed on its shaft and operated by a simple eccentric on the cylinder shaft not shown. The connection is made through the rod, X, with adjusting screws, M M, to the lever, X′, and the weight hook, X^5.

Five important advantages result from this disposition:

1. The time available for detaching and drawing through the top comb is greatly prolonged.

2. The top roller is as easily set as a drawing head roller, doing away with any delicate adjustment.

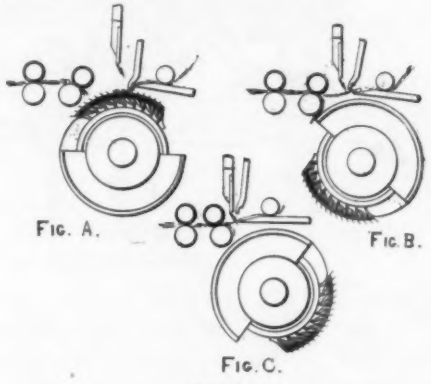


FIG. 6.

3. No definite and fixed surface speed of the roller is imposed and a smooth cam takes the place of the abrupt notch wheel cam.

4. The shock and deflection of the leather roller when it drops on the cylinder under the influence of weights is done away with and a

25-pound weight easily works a 10 1/2-inch lap of 600 to 700 grains per yard.

5. A long overlap and perfect piecing are obtained even with a 7/8-inch stock.

The cylinder, like the Heilmann, has seventeen rows of needles, but no fluted segment, this being replaced by a plain, polished, filling-up segment. Its construction is further improved by the absence of the end bosses with their objectionable set screws, so that the ends are plain and the cylinder is completely encased except under the nipper.

Having described the details of the machine we may follow it through one cycle of its operations. Fig. 6 shows the main organs in three positions. The first, Fig. a, shows the needles passing through the end of the lap, held down by the closed nipper, which is now in its rearward position (the dead point of the crank). Before the fine needles have passed the nipper is already moving forward in the same direction as the cylinder, thus reducing the effective speed at which the needles are passing through the cotton and easing the strain on the fibre. In Fig. b of Fig. 6 the needles have passed and the nipper is about the middle of its path toward the detaching rollers. As the last row of needles passes under the detaching rollers, the latter turn backward and owing to the top roll leaning toward the cylinder, the end of the combed fleece thus delivered backward is projected into the space between the last row of needles and the plain segment whose front edge strokes the fleece close against and under the bottom roller, so as to present a clean surface to the advancing nipper tuft for piecing. Meantime the nipper having opened the lap end rises automatically and points directly towards the nip of the rollers. It would rise higher but is met by the falling top comb and kept in proper position. The detaching rollers now begin to turn forward and seize the tips of the fibres presented by the advancing nipper and pull the lap end into the top comb. The nipper continues to advance, but with diminishing speed (approaching the dead point of the crank) thrusting the end of the lap gradually into the nip of the rollers, which successively seize fresh fibres and draw them off through the top comb. The top roller is withdrawn before the advancing nipper and top comb, but is eventually overtaken by the nipper as both the nipper and the roller arrive at the end of their respective paths; this is best seen in Figs. 5 and 6. The rollers revolve an instant longer to commence the separation, which is completed by the withdrawal of the nipper and top comb, leaving a short combed end projecting from the rollers, and the process recommences.

The overlap of the piecing thus obtained is about two inches as compared with about 5/8-inch on a Heilmann for any staple. Further the detachment is a comparatively slow and continuous operation, compared with a practically instantaneous snatch in the Heilmann, as both leather roller and fluted segment are moving at full speed when they fall together, whereas the rollers in the Nasmith are only starting up slowly when they seize the nipper tuft. Again the Heilmann roller drops on the nipper tuft about 3/8 to 1/2-inch from the tip, and so to speak in the quick of the lap, where it draws with difficulty whereas the Nasmith rollers seize the lap by the extreme tip where it draws easily and without undue strain. The Heilmann rollers have to complete the separation without assistance from the nipper, consequently much of their forward movement is unproductive, while the forward motion in the Nasmith is almost entirely used for producing, the separation being completed by the nipper.

The machine is built with a stop motion to each head and a coiler stop motion. When required an adjustable full can stop motion is also added.

The width of lap recommended is 10 1/2 inches, but the same machine can be made to work 10 1/2 inches or any less width at trifling cost.

The weight of lap, 10 1/2 inches wide, may vary from 360 to 600 grains per yard (15 to 25 pennyweights) for Sea Island, according to quality of work required and from 528 to 768 grains per yard (22 to 32 pennyweights) for Egyptian and American cottons.

The waste for ordinary work may vary from 12 to 30 per cent. and for semi-combed 5 to 12 per cent., according to the quality required.

Double combing is cheaply done with this machine owing to its high production and

the second combing may take 3 to 8 per cent. of waste.

As stated, over 350 machines had been delivered up to August 30, and are doing all kinds of work from short American, comber and card flat waste to the finest double combed Sea Island, and 80 machines are on order.

A list of all the users would be too long to be here given, but the following are typical:

J. Marsden & Sons, Ltd., Bolton (F. S. A.), 19 ordered in three lots.

M. MacConnel & Co., Ltd., Manchester (F. S. A.), 22 ordered in 4 lots.

Horrockses Crewdson & Co., Preston, 14 ordered in 1 lot.

Hollins & Son, Nottingham, 6 ordered in 2 lots.

J. & P. Coats, Ltd., Paisley, 10 ordered in 2 lots.

Twerskoi Manufacturer, Moscow, 10 ordered in 2 lots.

Savva Morosoff Sons & Co., Moscow, 10 ordered in 2 lots.

Spinnerei a/d Lorze, Switzerland, 36 ordered in 4 lots.

Stop Motion for Ring Twisters. Brooks & Doxey, Manchester, England. An improved stop motion for twisting machines which is said to be very effective.

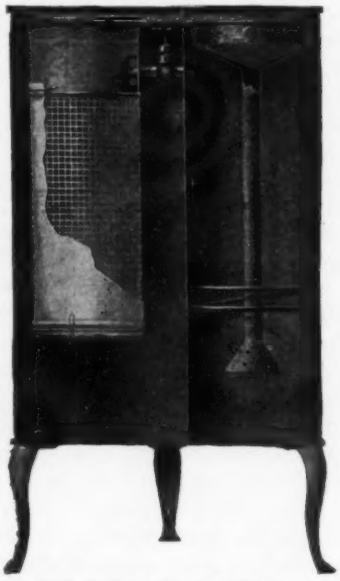
Cloth Folding and Measuring Machine. Hacking & Co., Bury, England. An improved machine for folding and measuring cloth. The machine is said to run very easily, making practically no noise when running 120 folds per minute.

Stretcher for Spindle Banding. Kunze & Co., Grosszschachwitz, near Dresden, Germany, have recently brought out a device for stretching new spindle banding before it is put on the spindles. New banding often causes much trouble when first put on and it is the object of this machine to remedy the difficulty by stretching the banding so that it will not change materially in length after it is put on the spindles.

THE PURIFICATION OF OIL.

The effectiveness of any device depends upon its design, construction and adaptation to the required work. The White Star oil filter is believed to combine the essentials of a complete device for accomplishing the purifying of oil.

As seen in sectional view, the filter is divided into two compartments. The smaller one is a reservoir for impure oil and water, containing a funnel for receiving the dirty oil and the steam coil for heating the water.



THE WHITE STAR OIL FILTER.

The impure oil is poured into the funnel and drains through the sieve, discharging below the surface of the water through holes in foot of tube. The thinning of the oil by its exposure to the heat in passing through and resting on the surface of the water promotes the precipitation by gravity of all heavy particles of grit and dirt, the accumulation of which at the bottom can be quickly flushed out by opening the faucet, which may also serve to drain off any excess of water in the chamber.

When sufficient impure oil has been introduced to reach the level of the inlet pipe, it flows into the filter cylinder which is suspended in the larger compartment. This

cylinder is unique in that it consists of a sheet metal neck and bottom with a section of coarse wire mesh between, around which several layers of cloth are wrapped. The oil in passing out of this cylinder through the cloth is thoroughly and quickly freed of every remaining impurity and accumulates in the surrounding chamber which comprises the remaining two-thirds of the filter, giving, it is claimed, an unequaled storage capacity for pure oil.

The filtering cylinder and every part of the filter may be quickly and easily removed and cleaned, enabling it to be kept in perfect filtering condition at all times. The manufacturers claim that in this most essential feature of a perfect and complete device, the White Star oil filter is not even approached by any other device.

In every engine room, and indeed, in every factory and mill where a large amount of machinery and long lines of shafting is in operation, there is a great waste of lubricating oil, owing to the fact that no provision is made for catching the oil after it passes through the shaft or engine bearings. Many times this is due to the style of bearing used on the shaft lines. Where suitable self-oiling bearings are installed and provision made for catching the drippings which accumulate in the drip cups, or where provision is made for catching the oil after passing through the engine bearings and then purifying these drippings through an oil filter, a great reduction in the size of the oil bills is certain to result.

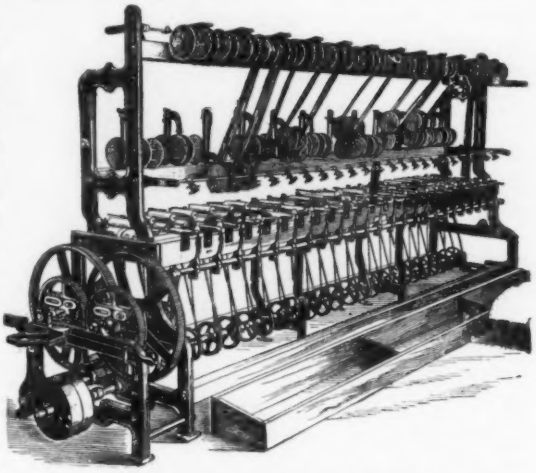
Every engineer appreciates the value of good oil and asks his employer to procure the best in the market for lubricating purposes, for the proper preservation of the machinery demands it. Getting a good grade of oil, the engineer will naturally be glad to use some filtering device for purifying the oil which has passed through the bearings, thus permitting its repeated use indefinitely.

An interesting test conducted by users of the White Star oil filter, manufactured by the Pittsburgh Gage & Supply Co., Pittsburgh, Pa., was recently made by O. J. Beaudette & Co., Pontaic, Mich., who found that in the first six months' operation of the White Star filter a saving of 364 gallons of oil, amounting to $54.60 was effected. As the original cost of the filter was but $28.00, the effectiveness of the device and profit from the investment are apparent. Another instructive case is that of the City Water Works of Marietta, Ohio. Before purchasing a White Star filter they were using a barrel of oil every two months, but with its use a barrel now lasts them four months. Further information concerning this filter, which users of oils cannot afford to ignore, can be obtained from the manufacturers.

THE ALTEMUS SHUTTLE BOBBIN WINDER.

The illustration shows a machine for winding shuttle bobbins, built by Jacob K. Altemus, 2818 North Fourth St., Philadelphia.

The latest improved model of this machine embodies the inventive skill, experience and workmanship of years, and the builders claim that in point of capacity, quality of work and quantity of production it is unrivaled.



THE ALTEMUS SHUTTLE BOBBIN WINDER.

The machine is built either to wind from the skein or from the spinning bobbin. The skein winder is equipped with a patent variable motion, which enables yarns from 8's to 90's to be wound direct from the skein to the shuttle bobbin. Cops may be wound as hard as desired. A cleaner is attached to remove the loose fibre. It can be speeded very high, giving a large production.

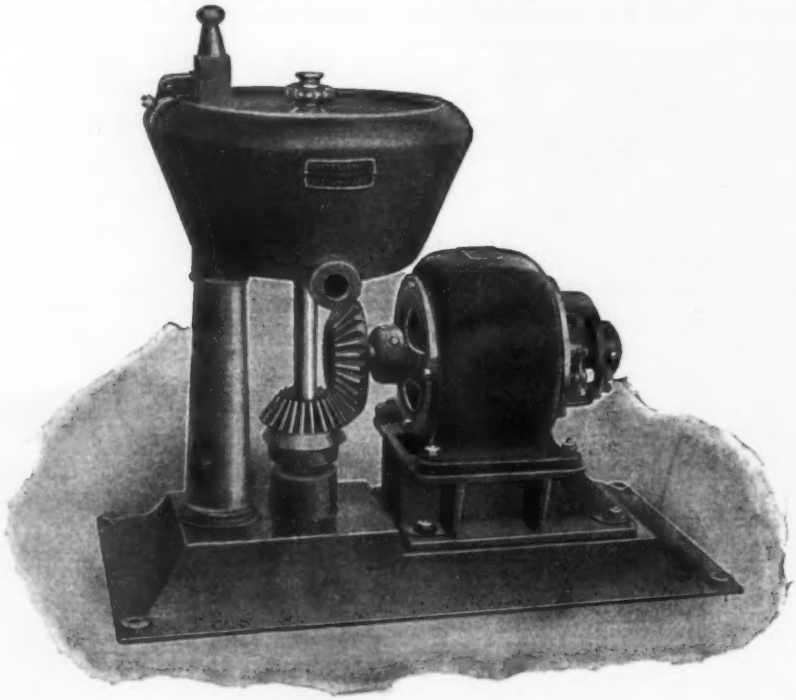
The Altemus Works have been quite busy this summer, and have received their full share of orders, which come not only from their immediate vicinity, but from all parts of the country.

ELECTRICALLY DRIVEN CENTRIFUGAL OIL SEPARATOR.

We illustrate on this page something new in the way of a centrifugal separator, which has recently been put upon the market by the American Tool & Machine Co., Boston, Mass. It shows their No. 1 electrically driven centrifugal separator with motors furnished for any voltage.

This machine is especially designed for use in machine shops and like establishments, to separate the oil from chips, turnings or cuttings of any kind, and from small work of all kinds that is made on screw or other machines where oil is a factor in its production. With it oil can be separated and used again almost indefinitely, there being, of course, some waste, but small in comparison to the waste where no separator is used. The large amount of oil annually wasted is a strong argument in favor of the use of such a machine.

These oil separators are well-made, compact and durable. The spindle quill or step is set between rubber springs and all are held in a casing at the base of the machine by a screw gland so that the proper electricity can be obtained by varying the tension of this gland. An inner pan with bronze sleeve, surrounding spindle, has a capacity of 750 cubic inches and is removed to empty the contents after the oil is extracted, an operation which ordinarily takes from five to eight minutes.



A CENTRIFUGAL OIL SEPARATOR.

The weight of the machine shown is 525 pounds, with a speed of 1,800 revolutions a minute. Further particulars will be furnished by the American Tool & Machine Co., 109 Beach St., Boston, Mass., or upon application to their New York office, 220 Broadway, that city.

The estimated number of cotton spindles in the United States on September 1, 1903, was 22,000,000.

AN EFFICIENT WARP STOP MOTION.

A warp stop motion which was brought to its present state of perfection in the King Philip Mills, Fall River, Mass., and in which mills the device is now running on nearly all the looms on a wide variety of goods, is shown in the accompanying illustrations. It is manufactured by The Coldwell-Gildard Co., Fall River, Mass., and is in successful operation in a number of leading mills in the Fall River, New Bedford and Blackstone Valley districts, on thousands of the Whitin, Northrop, Lowell, and Kilburn and Lincoln looms.

This stop motion was worked out and perfected in practical every-day work by some of the department heads of the King Philip Mill, and after three or four years of continuous operation, during which their business has reached its present volume, the manufacturers say that two points have been conclusively proved—first, that the stop motion is substantially "universal," being applicable to the widest range of work as to sley of goods, number of yarn and character of weave; secondly, that, in addition to low first cost and cost of installation, the maintenance charge is so low as to be a minor consideration, this being due to the fact that there are no moving parts to wear out and no vibrator to mutilate and destroy the drop bars, and further to the fact that nothing is removed from the loom—this again preventing the loss, damage or destruction of parts.

Warp stop-motions, if of proper efficiency, will tend both to decrease weaving cost and to improve the quality of the product. Hence, where the character of the work being done is such that the device can be applied, all looms should be so equipped.

The most important part of the weaver's work is keeping the warp pieced up and running smoothly. This is absolutely proven by the fact that any consideration whatever of automatic filling-supply devices develops the essential necessity for an effective warp stop motion. Further proof of this is in the fact that, as finer yarns are run, though the bobbin will run a longer time, the number of looms per weaver is sharply reduced because of warp breakage limiting his capacity; for, if such warp breakage is not closely watched and properly attended to, it means serious defects in the product. In other words, the number of warps a weaver can keep running smoothly is the measure of his capacity in looms. If the weaver's warp capacity can be increased, a number of things can be done to improve the facility in handling filling supply.

An efficient warp stop motion does more than anything else can to increase this warp capacity of the weaver, for it insures the weaver against serious trouble with any warp by immediately stopping the loom when any break occurs. This limits the stoppage on any loom to the absolute minimum required to repair a simple break, eliminating the shutdowns and long stops required by serious warp breaks, thus enabling the weaver to keep all his warps running the maximum percentage of the total loom running time and, as a consequence, giving the maximum product per loom and per weaver.

Hence, if an efficient and generally available, simple, and economical warp stop motion that will run the wide range of yarns, sleys, and styles of work that are now being woven on looms containing this motion can be put on any looms, one cannot afford to be without it, especially if its adoption does not involve the throwing away of present equipment but the increasing of its efficiency by simple addition.

The claims made for the Coldwell-Gildard stop motion are capable of ready verification and are in part as follows:

Continuous operation in every-day mill practice shows that this stop motion actually decreases the warp breakage. This is because of the novel form of drop bar and the peculiar method of applying the drop bars between the lease rods and on the lower banks of threads in the lease. This not only increases very much the freedom of the yarn in passing through the drop bars, as compared with any other form of stop motion, but also gives a light combing or separating effect as the yarn leads by the lease rods and through the drop bars.

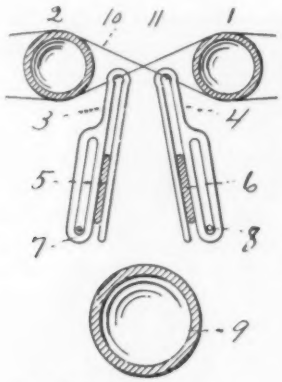
As regards general availability, the "C & G" stop motion is being run successfully on

yarns up to 120's and on goods up to 136 sley, 28's yarn. It is being run on single, double, and three-beam work, and other goods, comprising many fancies and lenos, and requires no change to meet all these conditions. It is running successfully on alpaca work and on plush "pile" warps.

On fine ginghams, where the limiting and damaging effect of warp breakage is most apparent, looms equipped with this stop-motion are showing a product per loom and per weaver, and of such perfect quality, that the results are unequalled.

does all hard usage of the drop bars, renders them practically indestructible. This means one small, easily maintained dynamo for, say, six hundred to one thousand looms in place of six hundred to one thousand sets of delicate vibrators and necessary mechanism that would be on the looms if the mechanical form were used.

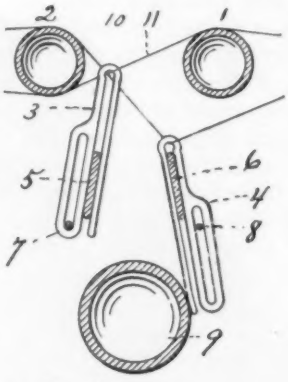
Owing to the way the contact is made, when the drop bar falls, and the manner in which the drop bar is maintained in contact, dangerous sparking is eliminated, the current that operates the stop motion flowing only



1, 2, Lease rods.
5, 6, Upper circuit guide-rods.
9, Lower circuit bar.

The above cut shows the stop-motion with drop-bars in normal position before break in warp thread, the electric circuit from the upper circuit guide-rods to the lower circuit bar "9" not being completed.

FIG. 1.



3, 4, Drop-bars
7, 8, Retaining rods.
10, 11, Warp threads.

The above cut shows stop-motion after a break in warp thread "10," the drop-bar "4" having fallen and completed the electric circuit from the upper circuit guide-rod "6" to the lower circuit bar "9," thereby stopping the loom.

FIG. 2.

It is furthermore claimed that the "C & G" stop motion is the simplest stop motion ever constructed, having the fewest number of parts, and hence it is the simplest and easiest to keep in order, requiring practically no attention.

The use of the "C & G" open drop bar reduces the cost of applying drop bars to the warp from fifty to seventy-five per cent. as compared with the cost of drawing-in, the drop bars being placed on the warp in the loom.

The "C & G" stop motion is operated by an electric current. This eliminates entirely the heavy form of drop bar which is necessary in all mechanical forms to withstand the action of the vibrators, and, eliminating as it

for a brief instant between the falling of the drop bar, which completes the circuit, and the throwing off of the shipper handle, which action breaks the circuit as the loom stops. This method of using the electric current for an instant only on each loom, combined with the perfect contact made by this form of drop bar, makes it possible, as above pointed out, for one small dynamo to supply the necessary current for a very large number of looms.

The "C & G" stop motion is supplied at a relatively low first cost and it is claimed that being of such extreme simplicity in construction and operation, it can be maintained at lower cost than any other stop motion.

It can be applied to any type of loom and a large part, if not all, of the device can be

transferred to any new loom. The maintenance charges are very light, there being practically no destruction of drop bars.

Fig. 1 shows the stop motion with drop bars in normal position, before break in warp thread, the electric circuit from the upper circuit guide-rods to the lower circuit bar "9" not being complete.

Fig. 2 shows stop motion after a break in warp thread "10," the drop bar "4" having fallen and completed the electric circuit from the upper circuit guide-rod "6" to the lower circuit bar "9," thereby stopping the loom.

These diagrams illustrate the following claims:

1. The simplicity of the device is apparent. There are absolutely no moving parts until a warp thread breaks. When a warp thread breaks, the drop bar falls, the electric circuit is completed, the knock-off is raised, the lay knocks the shipper off, and the loom is immediately stopped and the circuit thereby is instantly broken. The warp thread being pieced, the throwing on of the shipper immediately and automatically resets all circuit connections.

2. This method of hanging the drop bars gives twice as much room as any other method. It will be noted that the drop bar, as above shown, is hung between the lease rods on the two lower banks of threads in the lease so that the upper end of the bar does not protrude through the upper bank of threads and each drop bar, while necessarily in contact with the thread leading through it, is not in contact witn the adjacent threads of the warp or with any of the threads leading through the other banks of drop bars.

3. The form of drop bar permits the minimum weight when that is important. It also comprises a retaining rod situated under the warp threads and entirely clear thereof. Another form of retaining device covered broadly by these patents is a cover above the warps. The form shown in the sketch is the preferred form.

4. This combination of maximum room for the warp and minimum weight for the drop bar gives absolute minimum of friction and consequent minimum breakage of warp. The great value of this combination lies in the fact that the real, important factor of a stop motion to be considered is the amount of added friction caused by it on the yarn.

5. The electrical circuit to stop the loom is made by the drop bar, having a long contact on the upper circuit guide-rods, dropping into firm sliding contact with the lower circuit bar. From the sketch it will be noted that the drop bar in falling contacts in sliding by the side of the lower circuit bar, in reference to which it is so positioned as to wedge itself and maintain a firm contact.

6. The electrical circuit is immediately broken by the throwing off of the shipper. Thus the electrical power is used only for an instant.

This does away with any tendency to spark and operates a large number of stop motions with small power. One small, low voltage dynamo, occupying about a cubic foot of space, operates six hundred to one thousand stop motions.

Further information regarding this stop motion can be obtained on application to the manufacturers.

Warping Machine. Gerhardt Herbst, Krefeld, Germany. A sectional warping machine for making warps from yarn on the bobbin, in one operation. It is built specially for silk.

Centre Selvage Motion. George Hodgson, Bradford, England, has recently brought out a new selvage motion the chief feature of which is that only one set of needles is required, the usual stationary threads being replaced by ordinary warp ends.

Shell Roll. John Hetherington & Sons, Ltd., Manchester, England, have recently brought out an improved shell roll for draw frames. The improvement consists in the method of oiling the shell.

Semi-Automatic Loom. The Grossenhainer Webstuhl und Maschinenfabrik, Grossenhain, Saxony, have brought out a semi-automatic shuttle changing loom for heavy goods.

Dyeing, Bleaching, Printing, Etc.

THE ECONOMY OF THE STANDING KETTLE.

The maintenance of a dye kettle for continuous work is an important factor in dye house economy and should always be insisted upon whenever possible, especially where uniform shades are being dyed, as it not only tends to utilize the maximum dying properties of the colors used, but also secures more even shades.

Many dyes of the direct dyeing group are of such a nature that when dyed in the ordinary manner with Glauber's or common salt, and in proportions varying not much more than three pounds per 100 of cotton they exhaust almost completely, so that there is but little advantage in keeping a standing kettle except for the heat of the exhausted dye liquor, which forms an item of considerable importance. For many colors, such as the browns, blues, reds and blacks, standing kettles can be kept going for a week at a time—even for compound shades—if a little care is exercised in building upon the proportion of color remaining from the previous dyeing.

Where straight colors are used, for instance a direct black, with little or no mixture, or benzopurpurines, etc., the problem of a standing kettle is very simple, but where the dyes used are mixtures of rather large proportions of various colors, then the standing kettle becomes a menace to regular and even dyeing unless the dyes used in compounding the mixture exhaust from the kettle at the same rate. This is a point most frequently overlooked by those whose duty it is to suggest mixtures for dyes. The defect may not be immediately noticed, but the shades gradually change in tone to such an extent that in a short time the modified shade becomes quite apparent and leads to the condemnation of the dye, a result that would have never been noticed if single kettles only were used.

Heavy shades of diazotizable blacks and blues are always best dyed from standing kettles as being productive of the fullest and brightest shades. After each batch is dyed, it is simply necessary to make the proper addition to the bath, enter the fresh yarn, and proceed at once with the dyeing, thereby saving time and color.

In working a standing kettle with direct dyeing cotton colors, the dyer should consider the additions of salt to the dye bath which are made. It is usual to start dyeing with 25 pounds of salt, and to add 10 pounds of salt to the same kettle for each additional 100 pounds of cotton dyed. A simple calculation will demonstrate that in a very short time, the bath will become overloaded with salt, and that the washing of the dyed yarn will be effected only after great difficulty. By the time the fifth hundred pounds of cotton yarn are lifted out of the kettle, there will be left in solution about 56 1/2 pounds of salt, an increase of five pounds for each 100 pounds of yarn over that which is necessary for proper dyeing, not including the amount of salt usually carried into the dye bath with the dyestuff, which of course varies with the kind and price of the dye.

As 100 pounds of cotton will remove from the dye bath about 100 pounds of liquor, this liquor has in solution about 1/25th of the original amount of salt in the bath, or for the first 100 pounds there will be one pound of salt.

It is a mistake to assume that the salt in the dye bath is changed or altered in any way, nor is it volatile. If 25 pounds are added to the bath, and no liquor is removed, other than by evaporation, there will be 25 pounds of common salt remaining. Some dyers entertain the opinion that some salt is lost by evaporation or chemical change during the dyeing, but such is not the case.

Aside from the value of a standing kettle in producing level shades, there is always economy in using the old bath, which is pretty hot, as this affects an economy not

only in time consumed in heating the cold water to the boil, but in the amount of material dyed by such a system per day.

The sulphur colors are a group that are specially adapted to dyeing in standing bath. Indeed, their maximum efficiency is found when they are dyed from an aged and "ripe" kettle. Owing to their general character, they require a larger quantity of salt in the dye bath, due to the fact that they are relatively weaker tinctorially than dyes of other groups.

In feeding salt to the sulphur color dye bath, its quantity is regulated by the density of the bath at given temperatures, while with other colors the quantity is based upon the amount of material to be dyed, and the volume of the bath.

When the dyer has a variety of shades upon one class of material to dye, it is often possible to regulate the sequence, commencing with the lightest or brightest, and gradually progressing to the darkest, thus effecting economy not only in color, but in time and fuel as well.

PRINTED MERCERIZED EFFECTS.

To print mercerized effects, the white fabric is padded with a caustic soda lye strong enough to mercerize, but not strong enough to contract it. If the fabric is then rinsed and dyed with a substantive dye the mercerized places show dark on a lighter background of the same color. The effect may be increased with a tin discharge.

The printing color usually consists of 20 lbs. caustic soda lye of 40 deg. B., 10 lbs. tragacanth mucilage (65 to 1,000), and 10 lbs. British gum (1 to 1). The dye bath contains from 1/500 to 1/250 of its bulk of Turkey-red oil, but no Glauber's salt can be added till the mercerized places have taken the desired shade. When this has taken place, Glauber's salt is added, and the dyeing is continued till the unmercerized parts of the fabric are right.

To get crape effects with substantive dyes the white fabric, which must be thin, such as batiste, is printed with a thickening resistant to caustic soda, and to which the dye, together with albumen or chromium acetate for fixing purposes, has been added. The goods are then steamed for 15 to 20 minutes with albumen and for one to two hours with acetate of chromium, and then passed full width through caustic soda lye of 40 deg. B. at such a speed that any given part of the fabric is in contact with the mercerizing liquid for from 10 to 15 minutes. Then rinse well, and dry stretched on a frame. The dyes used must, of course, resist the action of the lye, and they may be dyed or printed on first of all, i. e., before the application of the reserve. The partial contraction of the stuff gives the crape effect. The following are two recipes for reserves:—

PARTS BY WEIGHT.

1.—Dye	31 to	124
Water	3,596 to	3,720
British gum (1 to 1)	20,460 to	21,700
Albumen (1 to 1)	5,580 to	6,820
2.—Dye	31 to	124
Water	7,626 to	12,060
Tragacanth (65 to 1,000)	18,600 to	21,700
Acetate of chrome or of zinc, 22 deg. B.	310 to	1,550

—Leipziger Farber Zeitung.

Indigo.

Indigo is so intimately connected with India in the popular estimation that it will be a matter of surprise to most people to learn that the product constitutes less than one per cent. of the total value of the exports from that country. Since the artificial product was first placed on the market the price of indigo has dropped from $4.25 to $2.00 per pound. While this has been a severe loss to the Indian industry, it has also affected the profits of manufacturing the artificial product. Much of the land formerly devoted to the culture of indigo has been diverted to other uses, and the production has greatly decreased. Efforts are now being made to improve the methods of cultivation and it is confidently hoped that the cost of production can be reduced to a point where the natural product can compete with the artificial indigo.

ARTIFICIAL SILK.

A careful study of the various fibres and fabrics exhibited at the World's Fair at St. Louis cannot but impress upon the visitor the important position occupied by the various fibres that are known by the broad name of artificial silk. To many textile people who were otherwise well informed, the elegant exhibits of fabrics made from this class of raw material was indeed a revelation, and did more to create a better feeling towards this new fibre than any other form of notice. Here was to be seen the raw material in the form of wood or raw cotton, the acids used in treating it, and the alcohol, ether and other chemicals used to prepare the finished product.

One thing that was of vital interest to the American manufacturer and dyer was the innumerable shades shown, and to quite a few dyers of silk this was astonishing. Not only was there a full range of colors, but the fastness to the usual influences, evenness of shade, and brilliancy in some grades even excelled the real silk.

By way of introduction, the following remarks may be of general interest to the reader. Artificial silk is made by several processes, the most important being those of the French Count Chardonnet and of Dr. Lehner. Briefly, the process is to make a collodion cotton, by treating clean raw cotton with a cold mixture of concentrated nitric and sulphuric acids, then to wash the nitrated cotton, dry it, and then to dissolve it in a suitable mixture of alcohol and ether which will yield a viscous fluid of "collodion." Such a fluid containing from 10 to 12 per cent. of nitrated cotton is further treated with dilute sulphuric acid to increase the fluidity, when it is filtered, and forced through very fine glass tubes into water, which at once causes the collodion to coagulate, at the same time forming a fine filament very closely resembling the natural silk in strength and lustre. Like natural silk several filaments are twisted together to form a thread.

In this condition the silk is still quite dull in appearance, but by the process of dehydrating, the threads become quite white, and highly lustrous. It is also quite inflammable, and to remove this objectionable property, the skeins are next "denitrated" by subjecting them to the action of sulphide of ammonia, thus destroying the nitrate of cellulose, and leaving pure cellulose with a high lustre.

Artificial silk is very easy to dye, and while very much has been written about it, there is absolutely no mystery in the process. As a rule, almost any class of colors are adapted to this fibre, but in practice the best results are secured by using the basic dyes, and in a few instances the direct dyeing colors.

The principal observation to follow is to keep the temperature in the region of 130 deg. F., starting cold.

For Scarlet: Dye with Safranine and a pure phosphine, varying shades to be obtained by changing the proportions. These colors are dyed neutral or with a very small quantity of acetic acid. Add the dyes to the bath in solution, and gradually feed up to shade.

Red: Safranine or Crystal Fuchsine. Shading can be done with either Methylene Blue or suitable makes of the Paris Violets.

Violet: Use the Paris Violets—dye neutral.

Pink: The most suitable dye to use for this shade is Rhodamine B or other desirable make.

Blues: Methylene Blue.

Green: Methylene Blue and Thioflavine T.

Dark Blue: Methylene Blue as a base color shaded with a blue shade of Methyl Violet.

Yellow: Thioflavine T.

Gold Yellow: Chrysophenine.

Artificial silk is nearly always very white, but should it be necessary to whiten it, it can be treated for 10 hours with a dilute solution of phosphate of soda, washing and then tinting with a blue shade of Methyl Violet.

It must be observed that upon immersing artificial silk in warm water it swells up and loses considerable strength, consequently it must be handled with care. Alkalies have an injurious effect on the fibres, while dilute acids are not injurious. Soaps can be used

with some dyes to advantage, having no action whatever.

Dry artificial silk absorbs 16 per cent. of its own weight of moisture against 11 per cent. for natural silk.

It may be interesting to observe that artificial silk cannot be weighted as the natural silk. This is due to two causes, first, the silk fibre will not take up the metallic oxides, and second, even if it did, its nature is such that it will not stand the temperatures nor handling necessary.

The following notes of a technical nature are of interest, especially as this type of silk is destined to play a very important part in certain lines of textile manufacturing. In order to ascertain the relative value of several makes of artificial in comparison with real silk, samples were obtained from different works and examined with the results as shown in the accompanying table.

KIND OF SILK.	Moisture.		Specific Gravity	No. of Fibres per square Millimeter.		Tensile Strength Kilos. per square Millimeter.		Extension
	Air Dry	Saturated		Wet	Dry	Wet	Dry	
Real Silk	8.71%	20.11%	1.36	9.710	9.710	37.0	37.0	21.6%
1. Chardonnet (Besaucon)	11.11	27.46	1.52	640	1.135	2.2	12.0	8.0
2. " (Fismes)	10.92	27.12	1.52	370	656	1.6	7.8	11.6
3. " (Walston, Eng.)	11.32	28.94	1.53	683	1.620	1.0	22.3	7.9
4. Lehner	10.45	26.45	1.51	413	1.180	1.5	16.9	7.5
5. Cellulose (Pauly)	9.20	23.08	1.50	742	1.550	3.2	19.1	12.5
6. Gelatine Silk	13.98	45.56	1.37	265	945	0	6.6	3.8

Physically, specimens 1, 2 and 4 were very close in appearance and were more lustrous than real silk, but did not have the characteristic feel or handle, being considerably stiffer, No. 3 being quite rough also. No. 5 was similar to Nos. 1 and 2, but its lustre was better.

Collodion silk, however carefully treated, always retains some unaltered nitro-cellulose, and consequently yields a more or less decided blue color with diphenylanine and sulphuric acid. In water, all artificial silks expand, but when placed in dehydrating agents, such as glycerine or alcohol, they soon contract.

In strong sulphuric acid they swell rapidly and dissolve, while the cellulose silks become thinner and then dissolve.

Solutions of iodine in potassium iodide color artificial silks an intense red or reddish brown, the color vanishes on washing with water, leaving the collodion a transient greyish blue. Cellulose silk does not exhibit this blue. Iodine and sulphuric acid stains true silk yellow, gelatine silk yellowish to reddish brown, collodion silks deep violet blue, while cellulose silks are turned pure blue.

Upon burning gelatine silks, the odor of burning glue or bones is suggested, while the cellulose silks suggest cotton.

While it cannot be expected that any artificial fibre can have the same physical and chemical properties of the real silk fibre, the remarkable properties of artificial silk are such as to demand close attention. While dress goods are not possible at the present time, there are very many other classes of textiles that are being made, such as fringes, tassels, laces, embroideries, hangings, vestings, tie material, etc., so that for many kinds of work this fibre is sure to grow in popularity, and increase in usefulness, and to such an extent that it will occupy a distinct place in textile manufacturing. Even at the present time there are quite a few mills using it, while it is understood that a plant for its manufacture is now in operation in eastern Pennsylvania.

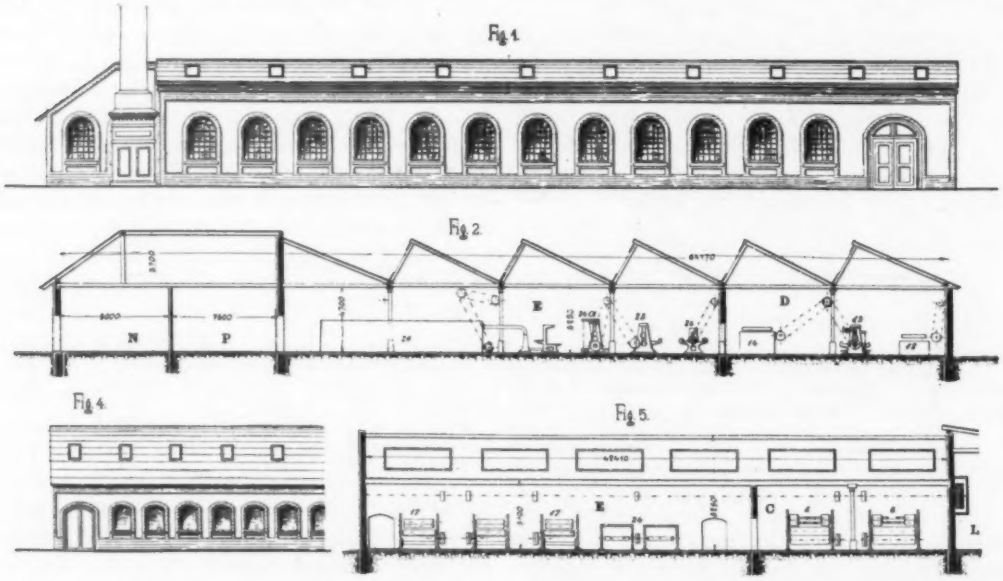
Next to iron and coal cotton is the most important article of commerce in the world, about 3,000,000 tons being consumed annually.

The countries producing the best flax in the world are, in the order of its excellence, Belgium, Ireland, France, Holland, Russia, Germany and Austria.

In the middle of the seventeenth century Spain was the principal grower of the finest wool; today Australian wool occupies the first place in point of quality and quantity.

BLEACH, DYE AND FINISHING WORKS.

Plans for a bleach, dye and finishing establishment, designed by the Rheimschen Webstuhl and Appreturmaschinenfabrik, Duelken, Germany, are shown in the accompanying illustration. The posts are set 23 by 26 1/4 feet apart, but these dimensions can be varied to suit particular conditions. The gray goods to be treated are stored in the room, A, from which they are taken to room, B, where they are napped and singed according to requirements and left in rope form.



The cloth now passes to the soaking tanks, 3, in the bleach room, C, where the sizing material in the goods is loosened, then to the impregnating machines, 4. The goods are next taken to the kiers, 5, where they are treated in lye under a pressure of several atmospheres according to the quality of the material. After this treatment they are given a preliminary rinsing in the kier and the rinsing is then completed in the washers, 6.

The cloth now goes to the chlorine machines, 7, where any impurities left by the previous processes are removed. The goods are next taken to the apparatus, I, and preferably left here over night to give the chlorine time to act on the fibre. The pieces are next treated in the washers, 6, and the souring machines, 8, in order to remove any traces of chlorine, which might injure the goods. For this purpose the material is left lying for some time on the apparatus, I I, and is then rinsed a second time and extracted. Up to this time the cloth has remained in rope form. The pieces are now opened by the scutcher, 9, and taken to the wet calender, 10, and finally to the cylinder drying machine, 11, where the bleaching process is completed. If the goods are to be finished white they are now taken to the finishing room, E. If to be dyed light colors they are taken to the dyehouse, D. In the latter case the cloth is dyed and washed on the jiggers, 12, and on the foulards, 13. If the cloth is to be colored black or dark colors the preliminary bleaching is not necessary. In that case the pieces are taken direct to the dyeing machines, 14 and 15, where they are colored the shade required.

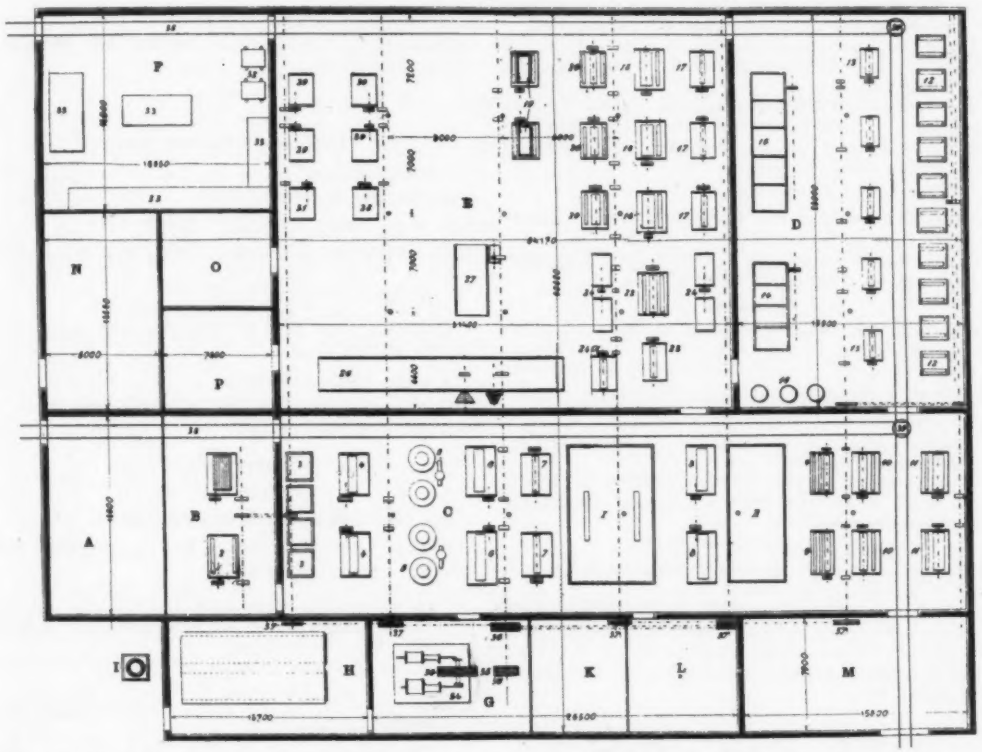
The starch used in finishing is prepared in the tanks, 16, which are located in the dye house. The pieces are treated in the finishing room, E, according to the effect desired. They are starched on the machine, 17, and dried on the cylinder drying machine, 18, then sprinkled and dried on the calender, 20, or mangle, 22, and finally wound on the machines, 23 and 24. Where a very uniform width is required the goods are dried on the

stretching machine, 24a, which is combined with a tentering and drying machine, 26.

Goods that do not require tentering are handled on the equalizing machine, 27, which removes slight differences in width and straightens the cloth if it is twisted out of shape. Finally the cloth is treated on the finished breaking machine, 28, and then either folded on machine, 29, and wound on machine, 30, or prepared by the folder, 31, for the press, 32, in room, F. In this room are a number of tables, 33, on which the goods are laid till they are taken to the stock room. The various machines are driven by the steam engine, 34, the power being transmitted by the rope, 35, from the pulley, 36, to the single pulley, 37. The power house is located near the engine room.

The room, K, is used for storing drugs; L is the manager's office; M, the repair shop. The offices, N O P, are located between the stock room, A, and the press room, F. A track, 38, is used for transporting material from one room to the other, or machinery in need of repairs to the workshop, M. The elevation, sectional and ground plans are shown at Figs. 1 to 5.—Translated from Uhland's Technische Rundschau by the Tex tile World Record.

Fig 3



Size Boiler. Richard Pruefer, Greiz, Germany. An improved apparatus for the preparation of size solutions. The circulation of the solution is automatically maintained.

Warp Printing Machine. F. Schmidt, Oberschoneweide, near Berlin, Germany, A machine for printing warps for carpets and other heavy pile fabrics. It is claimed that the Schmidt machine effects an important saving in time and does better work than with any previous process.

The fineness of wool is determined by the eriometer, a very delicate instrument consisting of a microscope and an indicating device.

New Color Cards.

Anthracene Chrome Blue F; Cassella Color Co., 182 Front St., New York.

Three samples of slubbing printed by the Vigoureux process with Anthracene Chrome Blue F.

Brown Dyeings Discharged with Hyraldite; Cassella Color Co., 182 Front St., New York.

Eight samples of cotton piece goods dyed various shades of brown and discharged with Hyraldite.

Direct Dyeing; Sykes & Street, 85 Water St., New York City.

Six samples of woolen yarn and six of slubbing dyed various shades with the Chrome Yellows, Orange and Browns by the one bath process. Full dyeing directions are given.

Anthra Cyanine 3 F L; Farbenfabriken of Elberfeld Co., 40 Stone St., New York.

A sample of woolen piece goods dyed blue with 4 per cent. of Anthra Cyanine 3 F L.

Katigen Green; Farbenfabriken of Elberfeld Co., 40 Stone St., New York.

Four samples of cotton yarn dyed different shades with Katigen Green 4 B and 2 G.

Diazo Fast Black; Farbenfabriken of Elberfeld Co., 40 Stone St., New York.

Five samples of cotton yarn dyed with Diazo Fast Black B, for which full dyeing and developing directions are given.

Methylene Green B; Farbenfabriken of Elberfeld Co., 40 Stone St., New York.

Two samples of cotton piece goods printed with Methylene Green B, and one sample of cotton yarn and one of cotton piece goods colored with the same dye after having been previously mordanted with tannic acid.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation Subscription price for the Dyers' Supplement $1.00 per year

Recipe No. 145.

Blue on Cotton Yarn.

Thionol Indigo Blue on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Thionol Indigo Blue.
(Thomas Leyland & Co., 53 India St., Boston.)
12 lbs. Sodium Sulphide Crystals.
10 lbs. Soda Ash.

Dissolve the above thoroughly and then add
30 lbs. Common Salt.

Boil up the dye bath, enter the yarn and dye just at the boil for one hour, rinse well and immediately and then after treat for 1/4 hour in a bath made up with

2 lbs. Potassium Bichromate,
1 lb. Acetic Acid.

For a standing bath only 4 lbs. of color is required for the same shade.

Thionol Indigo Blue possesses the characteristic properties of the sulphide colors, and is fast to light, washing and cross-dyeing.

Recipe No. 146.

Yellow on Cotton Yarn.

Tetrazo Yellow M on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Tetrazo Yellow M.
(American Dyewood Co., 156 William St., New York.)
30 lbs. Common Salt.

Enter yarn at 180° F., bring to boil and dye at the boil for one hour.

Tetrazo Yellow M gives an excellent and bright yellow, and possesses the valuable properties of the direct cotton colors.

Recipe No. 147.

Blue on Worsted Yarn.

Anthra Cyanine F L on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Anthra Cyanine F L.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
15 lbs. Sodium Bisulphate.

Enter yarn at 160° F., bring to a boil and dye at a boil for one hour.

Anthra Cyanine F L is a level dyeing color which possesses very good fastness to light, acids, steaming and ironing.

Recipe No. 148.

Blue on Worsted Yarn.

Anthracene Chrome Blue G on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Anthracene Chrome Blue G.
(Cassella Color Co., 182 Front St., New York.)
3 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 110° to 130° F., bring to the boil and dye at a boil for one hour.

Allow the bath to cool somewhat and add

1½ lbs. of Potassium Bichromate,

and again boil one-half hour.

Anthracene Chrome Blue G gives very fast shades of blue when used as a self color and is particularly well suited for the production of compound shades. It may be applied upon chrome mordanted wool.

Recipe No. 149.

Pink on Woolen Cloth.

New Azo Coralline on 100 lbs. woolen cloth. Prepare the dye bath with

¼ lb. New Azo Coralline.
(C. Bischoff & Co., 88 Park Pl., New York.)
3 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter at 170° F. and dye at a boil for one hour.

New Azo Coralline dyes exceedingly level and is excellently suited for the dyeing of woolen flannel.

Recipe No. 150.

Green on Cotton Yarn.

Thionol Green 2 B on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Thionol Green 2 B.
(Thomas Leyland & Co., 53 India St., Boston.)
12 lbs. Sodium Sulphide (Crystals).
10 lbs. Soda Ash.

When the above is thoroughly dissolved add

30 lbs. Common Salt.

Boil up the bath, enter the yarn and dye just at the boil for one hour.

When the dyeing is completed rinse well and immediately.

Thionol Green 2 B possesses the characteristic properties of the sulphur colors, and is fast to light, washing and cross-dyeing.

Recipe No. 151.

Brown on Cotton Yarn.

Direct Brown G X on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Direct Brown G X.
(Edwin M. Thayer & Co., 106 Broad St., Boston.)
20 lbs. Common Salt.

Bring the dye bath to a boil, enter yarn and dye at a boil for one hour.

Direct Brown G X dyes very evenly and is particularly valuable for combinations.

Recipe No. 152.

Green on Cotton Yarn.

Thionol Green 2 G on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Thionol Green 2 G.
(Thomas Leyland & Co., 53 India St., Boston.)
12 lbs. Sodium Sulphide (Crystals).
10 lbs. Soda Ash.

When the above is thoroughly dissolved add

30 lbs. Common Salt.

Boil up the bath, enter the yarn and dye just at the boil for one hour.

When the dyeing is completed rinse well and immediately.

Thionol Green 2 G possesses the characteristic properties of the sulphur colors, and is fast to light, washing and cross-dyeing.

Recipe No. 153.

Brown on Cotton Yarn.

Direct Brown B B on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Direct Brown B B.
(Edwin M. Thayer Co., 106 Broad St., Boston.)
20 lbs. Common Salt.

Bring the dye bath to a boil. Enter yarn and dye at a boil for one hour.

Direct Brown B B dyes very evenly and is particularly valuable for shading purposes.

Recipe No. 154.

Yellow on Woolen Yarn.

Alizadine Yellow on 100 lbs. woolen yarn. Prepare the dye bath with

2 lbs. Alizadine Yellow previously dissolved in boiling water.
(Read Holliday & Sons, Ltd., 7 Platt St., New York.)
10 lbs. Glauber's Salt.
5 lbs. Acetic Acid.

Enter the wool cold, raise to a boil in three-quarters to one hour, boil one-half hour and if the bath is not exhausted add up to 1 lb. sulphuric acid and boil one-quarter hour longer. When the bath is exhausted add ½ to 1½ lbs. Bichrome and boil ine-half hour longer.

Recipe No. 155.

Brown on Worsted Yarn.

Compound Shade on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Domingo Alizarine Claret.
2 lbs. Domingo Chrome Black F F.
(C. Bischoff & Co., 88 Park Pl., New York.)
10 lbs. Glauber's Salt.
5 lbs. Acetic Acid.

Enter at 160° F., dye at a boil and if the color is not exhausted after ¾ of an hour add a little sulphuric acid to exhaust.

When the dye bath has been exhausted add

3 lbs. Potassium Bichromate

and boil ¾ of an hour.

The compound shade produced in this way will be found to possess excellent fastness to all the common color destroying agencies.

Recipe No. 156.

Blue on Cotton Yarn.

Naptogene Blue 2 R on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Naptogene Blue 2 R.
(Berlin Aniline Works, 213-215 Water St., New York.)
20 lbs. Common Salt.
1 lb. Soda Crystals.

Dye at a boil for one hour, then diazotize by working for 15 minutes in a cold bath made up with

3 lbs. Sodium Nitrite,
12 lbs. Muriatic Acid,

and finally rinse and develop by working for 15 minutes in a cold bath made up with

1 lb. Beta Naphthol,
1 lb. Caustic Soda.

Naptogene Blue 2 R is much faster to light and washing than the ordinary color of this class, and will stand fulling without staining white material in the least.

Recipe No. 157.

Black on Worsted Yarn.

Acid Alizarine Black S N T on 100 lbs. worsted yarn. Prepare the dye bath with

6 lbs. Acid Alizarine Black S N T.
(H. A. Metz & Co., 122 Hudson St., New York.)
10 lbs. Glauber's Salt.
2 lbs. Sulphuric Acid.

Enter yarn at 100° F., bring to the boil and dye at a boiling temperature for one-half hour. Then add enough sulphuric acid (one to three pounds) to exhaust the color.

When the color has been exhausted from the dye bath add

3 lbs. Potassium Bichromate

and boil ¾ of an hour longer.

Acid Alizarine Black S N T is easily soluble in water, exhausts well, is absoluutely fast to rubbing, and possesses excellent fastness to all the common color destroying agencies.

Recipe No. 158.

Blue on Cotton Yarn.

Zambesi Pure Blue R B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Zambesi Pure Blue R B.
(Berlin Aniline Works, 213, 215 Water St., New York.)
100 lbs. Common Salt.
1 lb. Soda Crystals.

Dye at a boil for one hour, then diazotize by working for 15 minutes in a cold bath made up with

3 lbs. Sodium Nitrite,
12 lbs. Muriatic Acid,

and finally rinse and develop by working for 15 minutes in a cold bath made up with

1 lb. Beta Naphthol,
1 lb. Caustic Soda.

Zambesi Pure Blue R B produces dyeings which are much faster to light and washing than the ordinary colors of this class, and will stand fulling without staining white material in the least.

Recipe No. 159.

Green on Cotton Yarn.

Tetrazo Brilliant Green G on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Tetrazo Brilliant Green G.
(American Dyewood Co., 156 William St., New York.)
30 lbs. Common Salt.

Enter yarn at 180° F., bring to a boil and dye at a boiling temperature for one hour.

Tetrazo Brilliant Green G dyes an excellent green, which is extremely bright for a direct cotton color. It possesses all the valuable properties of the direct cotton colors.

Recipe No. 160.

Blue on Worsted Yarn.

Anthracene Chrome Blue B B on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Anthracene Chrome Blue B B.
(Cassella Color Co., 182 Front St., New York.)
3 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 110° to 130° F., bring the bath to a boil and dye at a boil for one hour.

Allow the bath to cool somewhat and add

1½ lbs. of Potassium Bichromate,

and again boil one-half hour.

Anthracene Chrome Blue B B gives very fast shades of blue when used as a self color, and is particularly well adapted to the production of compound shades. It is suitable for application upon chromed wool.

Mill News.

COTTON.

New Mills.

*Alabama, Selma. The Selma Cotton Mill, capital stock $100,000; N. E. Edgerton, president, and R. B. Whitley, treasurer and buyer, will begin dunning the mill about January 1st. They will make hosiery yarns, about 22's, operating 5,280 ring spindles.

*Connecticut, South Norwalk. Work is nearing completion on the new lace mill for Boese, Peppard & Co. It is expected that the plant will be ready for installation of machinery in about a month.

*Georgia, Eatonton. Operations will be started Oct. 10th by the Putnam Mills & Power Co., operating plant formerly known as the Eatonton Cotton Mills. Messrs. Floyd & Co. are the proprietors of the plant, which has capital stock of $75,000; O. B. Nisbet, manager, and R. K. Matthews, superintendent. They will make duck, osnaburgs and sheeting, operating 4,000 ring spindles and 200 looms.

*Maryland, Baltimore. It is thought that the new mill under construction for James Hooper will be completed by Dec. 1st. The building will be three stories high and basement, brick.

Massachusetts, Holliston. Machinery has begun to arrive for the new Holliston Braid Mill, on Exchange street.

*Massachusetts, New Bedford. The main building for the new Kilburn Mill, recently incorporated with capital stock of $600,000, will be 133 by 442 feet, three stories, with engine room 35 by 84 feet and boiler room 40 by 126 feet. About 50,000 spindles will be installed.

Massachusetts, New Bedford. Charles D. Owen (Providence) and C. O. Dexter (Hamilton, Ont.) have purchased the Beacon Manufacturing Company's plant and will start operations soon, making a special grade of cotton goods. A two-story addition will be built on the west side of the mill and new machinery installed. Mr. Dexter will manage the plant. The sale of the above property was made through the office of R. D. Denny, 143 Federal street, Boston, Mass.

*Massachusetts, Taunton. Wm. B. Edgar is president of the Watuppa Mills, which will be established here, with equipment of 600 looms. Raymond D. Borden is treasurer. Capital stock is $250,000.

New Jersey, Braddock. Cedar Brook P. O. The new addition for the manufacture of novelty upholstery goods and draperies adjoining Frank Bailey's works, at Braddock, Camden Co. (P. O. address Cedar Brook), has been completed. A weave shed, large enough to operate (20) twenty looms with all equipments, also a boiler and engine house, constitute the new addition. A new engine, boiler and other machinery is being rapidly installed and will be ready for operation about the middle of September. The parties interested in the enterprise are: Frank Bailey, president and treasurer; Arthur J. Steel, manager and buyer and Ben Bailey, secretary, and will be known as the Bailey & Steel Mfg. Co. They will buy the following yarns, cottons 30/1, 30/2, 40/2, 8/3, warps 16/3, 16/2, 30/2, 12/3 skein, also silk yarns. No dyehouse is attached to the plant as yet. Mr. John Brooks, of Philadelphia, will handle the line for Philadelphia and the South. The agent for New York and the East has not been settled on.

*North Carolina, Greensboro. Contract has been awarded for erection of new buildings for the Etowah Mills. The spinning mill will be 120 by 302 feet, two stories and basement; weaving plant, 136 by 252 feet, two stories; dye house, 40 by 136 feet, two stories; finishing plant, 40 by 136 feet, two stories, and boiler and engine house, 52 by 104 feet. This plant will start operations with 7,500 spindles and 500 looms, to be increased to 15,000 spindles.

*North Carolina, Marshall. Operations will be started about December 1st by the Capitola Mfg. Co.

*North Carolina, Newton. Work is nearing completion on the new plant of the Clyde Cotton Mills Co. and it is expected operations will be started about December 1st.

*North Carolina, Roaring River. Work has been started manufacturing brick for the new plant to be erected by the Damask Manufacturing Company. The main building will be 200 by 60 feet, two stories. W. L. Harper is interested in this company.

Pennsylvania, Philadelphia. George E. Rimer and George E. Leather are about to start up a business for the manufacture of tapestry curtains, table covers and novelties on 11 looms, with one winding frame and one beamer, etc., in the Dale Mill on Gillingham St., Frankford, the dyeing and finishing to be done outside. Mr. Leather, now employed by Masland & Sons, will superintend and manage the plant. The goods will be sold direct. The machinery has already been purchased and it is expected to be set up and in operation by October first.

Pennsylvania, Wyomissing. Ground has been broken for the erection of a large braid mill at this place. The building will be 200 by 50 feet, three stories and basement.

*Rhode Island, Barrington. The Rhode Island Lace Works, previously reported incorporated at Drownville, R. I., will start work on erection of their new building October 1st, and contemplate having same ready for operation January 1st, 1905. They will make trimming laces. Company is capitalized at $100,000; Geo. B. Frost, president; Joseph L. Buffum, treasurer, and Charles W. Shepard, manager. Will sell direct.

*Rhode Island, Woonsocket. The Manchester Mills Company is name of the concern which is installing 150 looms in the old Lippitt Mill, for purpose of manufacturing corduroys. The National Pile Fabric Company was erroneously reported as being the installers of the machinery.

Enlargements and Improvements.

*Alabama, Anniston. The Adelaide Cotton Mills, manufacturing yarns 8's to 20's, will install 1,200 new spindles in the plant, giving them a total of 5,000.

Alabama, Sylacauga. Ground has been broken for new building to be erected at the Central Cotton Mills, recently secured bv the Avondale Mills. It is proposed to double capacity of the mills here.

Arkansas, Monticello. Work is under way on an addition to the Monticello Cotton Mills. They will instal 2,500 additional spindles and 150 looms. Plant has a present equipment of 5,000 ring spindles and 150 looms.

*Georgia, Thomaston. The J. E. Smith Cotton Manufacturing Company will issue $30,000 worth of preferred 7 per cent. stock in connection with new addition to plant. They will add 8,000 new spindles and 300 looms.

*Maine, Augusta. Operations will probably be resumed by the Edwards Cotton Mill September 12th. Extensive repairs have been made to the plant during the shut down, including new set of pickers, moisteners and additions to the electrical plant and repairs to about 700 looms.

Massachusetts, Dodgeville. Work has been started on erection of a brick addition, 50 by 70 feet, three stories and basement, to the Dodgeville plant of the Hebron Mfg. Co.

Massachusetts, Fall River. The Pocasset Manufacturing Company will place about 16,000 mule spindles in the plant with 13,000 frame spindles.

*Massachusetts, Franklin. The Ray Fabric Mills have discontinued night operations. Some new machinery is being installed and as soon as ready will be started up.

*Massachusetts, Fall River. At meeting held recently by the stockholders of the Davis Mills it was voted to issue bonds to amount of $500,000 to take care of indebtedness on the plant. This plant has about 52,000 spindles and is not yet fully equipped, although it had been running for some time previous to strike. The bonds will bear interest at five per cent.

Massachusetts, New Bedford. A cotton storehouse, 242 by 322 feet, is to be built for the Manomet Mills.

Massachusetts, Taunton. The Whittenton Mills have been closed for two weeks for purpose of installing new machinery in the spinning department and making other repairs to the plant.

*Mississippi, Columbus. The Tombigbee Cotton Mills, reported replacing old machinery with new, are putting in new machinery from the picking room to spinning room at a cost of about $25,000.

*Mississippi, Magnolia. At meeting held recently by stockholders of the Magnolia Cotton Mills, the capital stock was increased from $100,000 to $200,000 for purpose of doubling the plant.

New York, Long Island, Patchogue. The Patchogue Manufacturing Co. proposes erecting a new building, 50 by 50 feet, two stories, for a bleachery.

North Carolina, Charlotte. The Fidelity Mfg. Co., whose plant has been closed for three weeks, have installed 2,000 new spindles, increasing spindles to 10,000. New twister and card-room machinery has also been put in.

North Carolina, Graham. The Carolina Mills are to be greatly enlarged and improved. A new building, 120 by 50 feet, three stories, will be built and equipped with 8,000 spindles and 500 looms. A steam power plant will be put in for emergency cases, company now using water.

*North Carolina, Morganton. The Alpine Cotton Mills, recently reported having increased machinery, will do no building nor buying of machinery.

North Carolina, Raleigh. The Caraleigh Mills have been closed for ten days for making repairs, including erection of a new dye house.

Pennsylvania, Chester. T. I. Birkin & Co., manfacturers of lace curtains at 2nd, Clayton and Trainer Sts., who have been making very extensive alterations to their factory, are considering plans by Messrs. Ballinger & Perot, Philadelphia, for further alterations and additions to their plant, to be made in the near future.

Pennsylvania, Clifton Heights. The Colonial Manufacturing Co., Welsh and Dick, proprietors, are doing a good business on Turkish towels, etc., on 3 broad and 14 narrow looms. New dyeing machinery has recently been put in their dye house and they expect to have their bleachery in operation within a month or so.

Pennsylvania, Philadelphia. The New York Tapestry Mills, 1822-24 Cadwallader St., operating 28 broad looms on upholstery goods, has been taken over by the Armure Tapestry Mills, 2739 Fairhill St., manufacturers of the same kind of fabrics. The latter concern has bought out the entire business, machinery, etc., and is now operating it in conjunction with their mill on Fairhill St., under the direction of Albert Mitchell, the president and superintendent.

*Pennsylvania, Philadelphia. Work is progressing on the new mill, 40 by 200 feet, one story and basement, for Sibson & Stern, Inc., on Stenton Ave. and Wyoming Street.

Pennsylvania, Philadelphia. Contract has been let for erection of a two story fire tower to the John Mawson Hair Cloth Company's mill.

Pennsylvania, Philadelphia. George S. Cox & Bro., manufacturers of hair cloth at Cambria and Ormes streets on 168 looms, have taken over the two floors just now being vacated by M. B. Laubach, manufacturer of hosiery, in which they are putting 45 new looms, to be operated on the same class of goods.

*Pennsylvania, Wilkesbarre. The Wyoming Valley Lace Mills have been erroneously reported as to build an addition to the plant. They are only to enlarge the power plant and expect to install one more 150 h. p. boiler.

Quebec, Montmorency Falls. A new bleaching plant is to be installed in the Montmorency Cotton Mills. About $50,000 will be expended for the purpose.

Rhode Island, Arkwright. The Interlaken Mills are installing new carding machinery.

South Carolina, Chester. An additional building, 116 by 50 feet, two stories, will be erected for the Springstein Mills. They will install 6,048 new

*South Carolina, Darlington. Arrangements are being made by the Darlington Manufacturing Company to install 12,000 additional spindles.

*South Carolina, Easley. The Glenwood Cottons have recently completed installation of 2,000 spindles and 30 looms and will not install any more for some time. They have a total equipment of 18,240 spindles and 446 looms.

*South Carolina, Fort Mill. Operations are about to be started on new machinery which has just been placed in the Millfort Mill Co.'s plant. This consisted of 5,000 spindles and 150 looms.

*South Carolina, Greenville. The Woodside Cotton Mills have increased the capital stock to $400,000. An additional mill is under construction with capacity of 30,720 spindles and about 900 looms, although the entire equipment may not be installed at first.

*South Carolina, Newberry. The machinery is being installed in the new addition of the Mollohon Manufacturing Co. and will soon be ready to start operations. The present capacity of the plant will be about doubled when new equipment is running.

*Virginia, Petersburg. The Matoaca branch of the Virginia Consolidated Milling Company's plant has been closed for three weeks for purpose of rearranging the machinery and also installing some.

Mills Starting Up.

*Georgia, Tennille. Operations will start about the middle of October in the Tennille Yarn Mills, making a fine quality of mule spun cotton hosiery yarns on cones. J. W. Smith is president of the company now operating the mills, T. N. Smith, vice-president, J. H. Arnall, treasurer, and C. Enos Bean, secretary and manager.

WOOLEN.

New Mills.

*Maine, Abbott Village. At special meeting held recently by the citizens of this place it was voted to exempt from taxation for ten years a three set woolen mill, which is to be erected, replacing the Moosehead Woolen Co.'s plant, destroyed by fire.

Maine, Skowhegan. The Maine Spinning Company has been incorporated with capital stock of $100,000, for purpose of manufacturing yarns, supplying the Marston Woolen Mills and the Lakeside Woolen Mills, the latter at East Madison. They will be located in plant formerly occupied by the Marston Worsted Co. Operations will be started at an early date. Edwin Gledhill is president of the company and N. A. K. Brooks, Wellesley Farms, Mass., treasurer.

*Montana, Manchester. The Manchester Co-Operative Woolen Mill Co.'s plant will be put in operation about November 1st.

*New Jersey, Passaic. Work is progressing on the new mill for the Forstmann-Huffmann Co., recently reported incorporated with capital stock of $750,000. This plant is to be operated on nothing but men's high grade cloth for suitings. It is expected to have the plant ready to start up by the New Year.

Pennsylvania, Glen Riddle. The Glen Riddle Manufacturing Company has been incorporated with a capital of $10,000, the incorporators being as follows: James H. Billington, J. Ashley Blythe, W. Lewis Cooper, Charles J. Fox, Norman P. Sloan and Nicholas W. Still. This new company will operate the old Glen Riddle Mills containing about 260 looms on cotton worsteds and also make up cotton waddings, both of which will be sold direct. The new company is now letting out contracts for finishing machinery which will be installed as soon as it arrives at the plant. They will do their own dyeing, a dye house being connected with the mill.

Pennsylvania, Philadelphia. Wool velvet and woolen ingrain yarns will be manufactured by Messrs. Frank B. Birch & Son, on 13 sets, who recently took over the spinning plant of Messrs. James and George D. Bromley, carpet manufacturers, at Adams and Jasper streets.

Pennsylvania, Philadelphia. Bernard Robbins, of the firm of Grushlaw & Robbins, proprietors of the Pennsylvania Knitting Mills, 314 Market street, Michael Levin, until lately employed by the Quaker City Knitting Mills, Woodbine, N. J., as foreman knitter, Benjamin Belovsky and Henry C. Segal have asked for a charter for the Royal Knitting Mills Co., with capital stock of $10,000. It is the intention of the new company to manufacture sweaters, etc. Members of this company are now out looking over knitting machines handled by the different agents in this country and will give out as a first order a contract for 20 machines, with others to follow as soon as a suitable building is obtained.

Pennsylvania, Philadelphia. A two-set mill for the manufacture of woolen knitting and weaving yarns has been established at the northeast corner of Kensington Avenue and Huntingdon Street by a new company known as the Kensington Spinning Company. The plant, which is now running full time, is superintended by Mr. Samuel Taylor, at one time employed by the Chelton Mfg. Co. of Germantown.

Pennsylvania, Philadelphia. Rag and jute carpets are manufactured on a very extensive scale by H. H. Myer, who has leased the first two floors and basement of the old Mawson Hair Cloth Co. Mill at Coral and Dauphin Streets, where he is running 23 looms by both hand and electric power, selling the carpets direct. He uses 8/2, 8/3, 8/4, 5/8 and 4/4 yarns, making up his own warps.

Pennsylvania, Philadelphia. A new worsted spinning plant is to be established in the old Angora Mills, at 60th St. and Baltimore Ave. The machinery is now on the way from Europe and will be set up as soon as received. It is understood that the superintendent of a prominent worsted spinning concern in the city is interested and will also superintend the new plant when it is put in operation.

*Rhode Island, Bristol. The mill recently pur-

chased at this place by C. B. Rockwell, will be operated as the Namquit Worsted Mill. The first floor of the building will be used for weaving. The finishing department will be in the basement.

Rhode Island, Woonsocket. The Alsace Worsted Co., capital stock $120,000, will start manufacture of worsted yarns in November, with equipment of 7,000 worsted spindles and using the French system. Jacob H. Hary is president of this company, agent and superintendent, and Aram J. Pothier, treasurer. Will sell direct.

Enlargements and Improvements.

California, Stockton. The capital stock of the Stockton Woolen Mills has been increased to $150,000, for purpose of making improvements to the plant. Company has been reorganized under name of Stockton Woolen Mills Co.

Maine, Guilford. The Piscataquis Woolen Company is making preparations to replace the old boilers with new and larger ones, soon to arrive. A locomotive boiler has been set up outside and connected with the steam pipes so that operations can be continued during installation of new ones.

Maine, Oakland. The Oakland Woolen Company has installed a 125 h. p. engine in the plant, which will render the mill independent of water power.

Maine, Wilton. Additional machinery, including 20 looms, two sets cards and two jacks, is to be installed in the Wilton Woolen Mills.

*Massachusetts, Barre. The new addition for the Barre Wool Combing Co., Ltd., is nearly ready for the roof. This building is to be 100 by 80 feet, six stories, and will be used for a storehouse.

*Massachusetts, Blackinton. Waterhouse & Buffum, who have secured the old Eagle Mill at No. Adams, expect to have same ready to start operations about October 1st. They will install all new machinery, including 70 looms, for manufacturing high gfade worsteds.

*Massachusetts, Jefferson. The new building to be built for the Eagle Lake Woolen Co. will be 85 by 45 feet. The first floor will be for picker, dryer and gauze rooms and the floors above for weaving.

Massachusetts, Pittsfield. Additions are to be made to the spinning, carding and weave rooms of the Taconic Mills. Considerable new machinery will also be put in the above departments.

Massachusetts, Plymouth. An addition 100 by 50 feet, one story, is being built to Geo. Mabbett & Sons Co.'s mill for a finishing room.

Massachusetts, Webster. Contract has been let for the installation of an electric light system in the American Woolen Co.'s Chase Mill. The new addition to the mill, now completed, will also be equipped with electricity.

Michigan, Sault Ste Marie. The capital stock of the Soo Woolen Mills has been increased from $15,000 to $60,000. The company has recently made an addition to the plant, increasing capacity.

New Hampshire, Tilton. A. D. Carter's mill has been closed for two weeks for purpose of making repairs on the water power.

New Jersey, Trenton. The Colonial Woolen Mills will close down for a few days for the purpose of making some necessary improvements. A 125 h. p. engine will be put in.

New York, Rochester. New pickers and dyeing machinery have recently been installed in the Allen Woolen Mills.

Ohio, Cleveland. A new building, 55 by 100 feet, three stories, for carding and storage purposes, is under construction for the Cleveland Woolen mill.

Ontario, Lanark. A new one story addition, brick, will be built to the Clyde Woolen Mill, Caldwell, Boyd & Co., proprietors.

Pennsylvania, Bristol. Work has been completed on new addition to the Leedom Carpet Mills. This department will be equipped for making fancy high grade Wilton rugs, woven full width with borders.

*Pennsylvania, Philadelphia. The fire which recently burned out the picker house of the Fowler Waste Manufacturing Co., 414 S. Front St., manufacturers of cotton and woolen waste, cotton batts, shoddies, etc., destroying 2 pickers, shredders, stock, etc., damaged the plant to the extent of $1,500. New machinery has been ordered to take the place of those destroyed and will be put up at once.

Pennsylvania, Philadelphia. Thomas Graham, Sr., who started up about 18 months ago in the manufacture of ingrain carpets on four looms, states that his business has increased so rapidly and is still increasing, that it has been necessary for him to put in two more looms, making six in all, which are running full time. Mr. Graham also says that he has enough work for an addition of two more looms, which he will put in in a short time. The carpets are sold direct.

Pennsylvania, Philadelphia. Messrs Shapcott & Weaver, manufacturers of roller coverings of wool, who recently removed to the Hoffman Mill at Angora, are installing machinery for the manufacture of their own yarns, consisting of three sets of cards and other machinery. They also run five broad looms. Mr. Richard Shapcott is the buyer and superintendent.

*Pennsylvania, Philadelphia. James Bromley, in addition to the other two buildings recently built for him at Adams and Leiper Sts., Frankford, has just been granted a permit for the erection of a one-story mill, on the same site, 48 by 83 feet, to cost $3,000.

*Rhode Island, Oakland. The new building for weaving and finishing for the Oakland Worsted Company will be 120 by 65 feet, one story and basement.

Rhode Island, Providence. Ten new looms have been installed in the Paramount Worsted Mills.

Tennessee, Cleveland. Extensive improvements are being made to the Cleveland Woolen Mills. They will almost double present capacity of plant, when completed.

KNIT.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

*Maryland, Hagerstown. The Hagerstown Silk Company has the new mill under roof and will be ready for operations by early spring.

*Maryland, Hagerstown. The D. Frank Snyder Ribbon Mills have been put in operation. Plain and fancy ribbons are made and sold direct. Mill is equipped with 120 spindles and 5 looms, although there are accommodations for 16 looms.

Massachusetts, Holyoke. Contract has been let by the William Skinner Manufacturing Company for erection of the new mill proposed some two years ago. The new mill will be about 200 by 60 feet, four stories high.

New Jersey, Paterson. The Paterson Silk Manufacturing Company has been incorporated with capital stock of $10,000 by Adolph Arons, 120 West 117th Street, New York, and B. S. Salkowitz, Paterson, N. J.

*New Jersey, Paterson. Work is underway on erection of new mill building for Jos. W. Congdon. The mill will be 103 by 53 feet, with rear extension 53 by 267 feet and will be occupied by the Proenix Silk Mfg. Co. and others.

New Jersey, Rockaway. A new silk mill is to be started here by a Paterson concern. Machinery will soon be placed and operations started. They will occupy the old Morris County Manufacturing Co.'s plant.

*Pennsylvania, Duryea. The new plant of the Dutton Silk Co., which has been put in operation, throwing silk, is equipped with 5,000 spindles. Company has capital stock of $30,000. William Dutton is president of the concern and James Dutton, treasurer.

*Pennsylvania, Erie. The buildings for the new silk mill have been finished and are now ready for the machinery.

*Pennsylvania, Mercer. The Mercer Silk Mill has started operations.

*Pennsylvania, Nanticoke. The Nanticoke Silk Throwing Company will start operations in their new mill about the first of the new year. This company is capitalized at $50,000, with James Govean, president and superintendent, and Peter Magagna, treasurer. Plant will be equipped with 6,000 spindles and operated by steam.

Pennsylvania, Philadelphia. The Germantown Textile Manufacturing Co., 79 Wister St., Germantown, report a fair business on their fine grade of upholstery fabrics, which they are making up on eight broad looms, of silk, cotton and worsted, Otto Zschamisch superintending the establishment. The officers of the company are Otto Zschamisch, president; Charles F. Fechtman, vice-president and Oscar J. Steidel, secretary and treasurer. The plant is run by steam.

Pennsylvania, Philadelphia. The North American Velvet Co. is the name of a new concern recently started up in Manayunk for the manufacture of velvets. The concern is now running six hand looms which they expect in the very near future to increase and run by steam. The main office is located at 615 Walnut Street, where the goods are sold direct. The company is not incorporated.

Pennsylvania, Pittsburg. A new silk mill will shortly be started here. Plant is located on Flowers Avenue, Hazelwood, and will manufacture wide black silk and ribbons. M. Blakey & Sons are the owners.

Enlargements and Improvements.

Connecticut, Watertown. Plans have been prepared for an addition to the Heminway & Bartlett Silk Company's plant. The new building will be 75 by 72 feet. A new 150 h. p. boiler has recently been installed by the company and a new engine will shortly be added.

New York, Amsterdam. A new addition is nearing completion to the Amsterdam Silk Mills.

Pennsylvania, Bradford. Arrangements are being made for enlarging Henry Leon's silk mill, for purpose of doubling the present capacity.

Pennsylvania, Carlisle. The branch mill of the York Silk Co.'s plant at this place has been closed for a few days for purpose of making repairs and installing some new machines.

Mills Starting Up.

*Pennsylvania, Chambersburg. The new Chambersburg Silk Manfg. Co.'s mill was started up on Monday of this week. The plant is installed in a two story brick building 120 by 40 feet, in which they will run 50 looms, 20 being already in position. They will manufacture broad silks. Fritz Thomas is the superintendent.

*Pennsylvania, Lansford. Operations have begun in the Century Throwing Company's new mill.

Mills Shutting Down.

*New York, Hornellsville. Operations have been resumed in the Merrill Silk Company's mill. This plant was closed about a month ago for purpose of making repairs, etc.

MISCELLANEOUS.

New Mills.

*Colorado, Denver. Robert Miller (Tiffin, O.) is president of the Denver Wool Co., capitalized at $100,000; Dallas J. Osborne, treasurer and Rudy Studybaker, superintendent. Plant is for wool scouring.

Pennsylvania, Philadelphia. A permit has been granted to John M. Kennedy, Jr., for the erection of a two-story dye house, 64 by 64 feet, on C St., south of Ontario.

Pennsylvania, Philadelphia. The Trimble Dyeing, Printing and Finishing Co. has taken over the plant of the late firm of James Martin & Co., at Richmond and Tioga Sts. The new company is now putting the machinery in condition for operation and expect to have it in working order within a week. It is their intention to dye, print, mercerize and finish cotton piece goods, running four printing machines. The officers of the company are John Williams, president, and George T. Wil-

liams, treasurer, both parties being connected with the John Williams Manfg. Co., manufacturers of flannels, cassimeres, dress goods, etc., at 12th and Carpenter Sts., and Trenton, N. J., operating five sets and 232 looms. The superintendent is Henry C. Brooks. This is one of the largest establishments of its kind in Philadelphia.

*Rhode Island, Bellefont. Work has been started on erection of new building for the Whittle Dye Works, recently destroyed by fire. The new plant will have capacity of 4,000 pieces per day. It is expected to have the plant ready about the middle of December. The main building will be 250 by 150 feet, with adjoining building, 250 by 75 feet, for gray room and bleach room. A new engine and dynamo for electric lighting will be installed.

*Washington, Seattle. Work is well under way on new plant for the Portland Cordage Co., to be located at Interbay. It is expected that the buildings will be ready for use in about two months.

Enlargements and Improvements.

*Pennsylvania, North Wales. Work started September 1st on erection of new addition, 100 by 40 feet, two stories and basement, for the Asbestos Fibre Spinning Co.

Pennsylvania, Philadelphia. Mathews & Pilgrim, coners and reelers of yarns, until lately at 321 Chestnut street, have removed to 810 Winter street. The business of this concern has increased very largely since they first started up and they are considering the matter of putting in new Foster winders and other machinery in the near future.

FAILURES AND SUSPENSIONS.

Maine, Camden. A petition in bankruptcy has been filed against the Megunticook Woolen Co. and Joseph Moore (Rockland, Me.) has been appointed receiver. For some time the company's financial affairs have been under criticism and they have been obliged to make all purchases in cash. Although no statement has yet been made of the affairs it is thought that the liabilities will amount to about $250,000. The receiver has been authorized to run out the stock of the company.

Massachusetts, Boston. W. B. Smith Whaley of the W. B. Smith Whaley Company, with offices in the Tremont Building, Boston, and Columbia, S. C., has filed voluntary petition in bankruptcy, giving his liabilities as upwards of $1,000,000 and assets of about $1,200, which does not include several hundred thousand dollars of stock, deposited as collateral for some of the claims. The list of creditors includes a large number of machinery builders, banks, commission houses, etc. Practically all the machinery claims are secured. This step is not a surprise to the trade, as Mr. Smith Whaley's affairs were known to have been involved for some time, ever since the reorganization of the mills in Columbia, S. C., of which he was the promoter and engineer, and had been president. Most of his liabilities were incurred in connection with the flotation of these companies and the endorsement of their notes, which were taken as additional security besides the mill paper. Mr. Whaley's bankruptcy petition is understood to be made with the view of straightening out his tangled affairs and connections with these old matters.

Massachusetts, North Adams. The Johnson-Dunbar Mills Company is reported in financial difficulties. An assignment has been made to William H. Prendergast, of Bridgeton, R. I. It is thought that the plant will be operated under the assignee until company is reorganized with more capital.

New Jersey, Paterson. Edward F. Merry has been appointed receiver for the Dordoni Silk Dyeing Company, on application made by Counselor David H. Bilder.

New York, Astoria. A petition in bankruptcy has been filed by Garson J. Newwitter, proprietor of the Imperial Silk Mills at this place and 453 Broome St., New York City. The liabilities are placed at $123,701, of which $49,000 is secured, and nominal assets of $105,506.

North Carolina, Coleridge. The Enterprise Manufacturing Company's plant has been placed in the hands of receivers, viz: John T. Brittain and Joseph A. Spence, on application made by Mrs. I. L. Caeveness and other stockholders. The property will be sold at auction October 1st. The liabilities of the company are placed at $15,000, with assets of $40,000

Pennsylvania, Lock Haven. The Lock Haven Knitting Company has been petitioned into involuntary bankruptcy by Antle Bros. (New York) and the Crawford Manufacturing Co. (New Brunswick, N. J.)

FIRES.

California, Marysville. The dye and scouring house of the Marysville Woolen Mills has been destroyed by fire. Loss is $15,000; fully insured. The building will be rebuilt at once.

Pennsylvania, Norristown. On Wednesday, the 7th inst., a fire which originated through a nail passing through one of the pickers in the picker room of the Coral Manufacturing Co., at Oak and Smith Sts., destroyed the entire establishment, causing a loss of $75,000. The mill run on art squares, rugs, etc., on 10 broad and 14 narrow looms, doing their own dyeing.

Rhode Island, Providence. The Narragansett Braiding Company's mill has been destroyed by fire. The loss is estimated at about $10,000.

Pennsylvania, Wiconisco. W. H. Sheafer's hosiery mill at this place has been destroyed by fire. The loss is placed at about $100,000.

FACTS AND GOSSIP.

Alabama, Huntsville. It is reported that T. W. Pratt, interested in the Southern Textile Co., will dispose of his New York interests and operate the West Huntsville Cotton Mill, which has been idle for over a year.

*Canada, Toronto. The assets of the Canada Woolen Mills have been purchased by William D. Long, of Hamilton, former shareholder and a creditor of the company for $180,000, for $253,000 cash. The sale was made in the courts. It is not yet known whether Mr. Long will operate the mills or form a company for that purpose.

Connecticut, Hartford. The Interstate Company has been incorporated recently with capital stock of $75,000, for purpose of manufacturing woolen, worsted and other goods. Lawrence J. Dolan, Thomas N. Hogan and William A. Jones are interested.

*Connecticut, Middletown. L. D. Brown & Son Company's silk plant has been purchased by Robert H. Stothart, representing other parties, for $36,000. The sale must be approved by judge of the Superior Court before property is transferred. It is reported that the purchasers of the plant contemplate operating it as a silk mill.

*Delaware, New Castle. The Equitable Guarantee & Trust Company is in possession of the New Castle Woolen Mills. It is stated that they will dispose of the plant if reasonable sum is offered.

Georgia, Augusta. The Fairfield Mills Co. has been organized with capital stock of $25,000 for manufacturing cotton goods. George S. Crouch, J. H. Vivian and T. W. Baxter (of Cartersville) are among the incorporators.

Georgia, Hartwell. Asa G. Candler, of the Witham Cotton Mills, is reported as interested in building a rope mill and is now considering same.

*Illinois, Chicago. The Diamond Braiding Co., reported recently as a new concern, has been in business for the past six years, but they contemplate incorporating the plant next year. The plant is equipped with 300 braiders, 5 dressers and 4 tipping machines, making shoe and corset laces. Goods are sold direct. They are negotiating for purchase of their plant and propose doubling present size.

Illinois, Chicago. The Illinois Commission and Manufacturing Company has been incorporated with capital stock of $40,000, for purpose of manufacturing knit goods. Israel Feldsher, Nathan Feldsher and Phillip Triester are the incorporators.

Illinois, Chicago. The Western Textile Fibre Company has been incorporated with capital stock of $10,000 for purpose of manufacturing textile fabrics. Ross C. Hall, William H. Hally and Geo. W. Spinner are the incorporators.

Illinois, Chicago. The Standard Wool Company has been incorporated with capital stock of $10,000 for purpose of drying and scouring wool. Joseph Grove and H. A. Blousat are among the incorporators.

Kentucky, Louisville. At meeting of the directors of the Hope Worsted Mills Co., held recently, $300,000 of the stock ($400,000) has been issued into common and $100,000 as preferred. Hitherto this was divided equally into common and preferred.

*Maryland, Baltimore. It is reported that efforts are being made to reorganize the Maryland Woolen Co., provided satisfactory arrangements can be made with the creditors. These mills are now in hands of receiver.

Massachusetts, Clinton. The carding and spinning departments of the Lancaster Mills have been closed for an indefinite period. The weaving department of the mill has not yet resumed operations in full.

*Massachusetts, North Adams. Willard P. Clark has been appointed receiver of the Johnson-Dunbar Mill Company.

Massachusetts, North Andover Depot. The Sutton Mills have started working nights.

*Massachusetts, Palmer. The assignees of the Grosvenor Woolen Co. are understood to have settled a large part of the merchandise indebtedness. The Holyoke plant was sold some time ago to W. H. H. Slack & Bro., and it is rumored that they may possibly take over the Palmer mill as well. Charles F. Grosvenor acts as superintendent of the Holyoke plant. The Palmer mill is closed at present.

Massachusetts, Saugus. The Saugus Manufacturing Company has been incorporated with capital stock of $90,000, by Samuel H. Bailey, Joseph F. Illingworth and Robert T. Rayomd. This is probably an incorporation to operate the Saugus Mill, which has been idle for some little time.

New Hampshire, Claremont. Operations have been resumed on full time by the Monadnock Mills, which were closed last month after a period of partial curtailment.

New Jersey, Gloucester City. English capitalists are reported as negotiating for the Gloucester Print Works building for purpose of equipping same for manufacturing calico.

*New Jersey, Paterson. V. Frank Wilcox has been appointed trustee of the Riverside Silk Company.

*New Jersey, Somerville. Geo. M. Bowlby, secretary of the Erie Coal Co., was elected trustee of the Somerville Woolen Mills, at meeting held recently by the creditors. A statement made by the receiver, Mr. Griggs, places the liabilities of the company at $164,000, with assets of $350,000. It is stated that Bacon & Co., of New York, hold a mortgage of $75,000 on the plant and they are desirous of obtaining possession so that operations may be resumed. The Somerville Woolen Mills will be sold at public auction October 6th. This property consists of two plants, one at Somerville, and the shoddy plant at Pluckamin, N. J.

Massachusetts, Springfield. M. Craven, 24 Salem street, is desirous of finding location in the South for a large woolen mill, which he contemplates erecting. The matter is under consideration, as nothing definite has yet been decided upon.

New Jersey, Paterson. The David Beckett Silk Company, whose plant in the Hall Mill was recently destroyed by fire, have secured the Fairhurst plant and have ordered new looms and ribbon machinery. It is expected that operations will soon be started up.

New York, Port Ewen. The Naumberg Prince Company has been incorporated with capital stock of $200,000 to manufacture cotton goods. E. S. Naumberg is one of the interested parties.

Personals.

Cotton.

P. M. Grimes, formerly superintendent of the York Cotton Mills at Yorkville, S. C., has arrived in Charlotte, N. C., to become superintendent of the Atherton Mills, which position he will assume at once. Mr. Grimes is a man well versed in textile work, having been engaged in such business for the past 15 years in Maryland and elsewhere.

R. H. Layton, formerly with the Orient Cotton Mills, Charlotte, N. C., has gone to Lancaster, S. C., to take charge of the card room in the Lancaster Cotton Mills. He succeeds C. D. Harmon.

J. W. Thompson has resigned as overseer of weaving and dyeing in the Tupelo Cotton Mills at Tupelo, Miss.

S. B. Tanner has been elected to succeed the late J. S. Spencer as president of the Henrietta Cotton Mill, Henrietta, N. C. Mr. Tanner has been connected with the mills for a number of years, holding the position of secretary and treasurer.

Robert Jackson has resigned as overseer in the Henderson Cotton Mills at Henderson, Ky., and is now in Union Springs, Ala.

J. H. Wilson, who has been at Lafayette, Ga., has gone to Monroe, Ga., to accept the position of overseer of spinning at the Monroe Cotton Mills.

J. W. Pollard has succeeded L. T. Hooper as overseer of weaving at the Moultrie Cotton Mill, Moultrie, Ga.

Mitchell Eno, who has been employed several years as overseer of the weave room of the Fiskdale Mills, Fiskdale, Mass., has severed his connection, and moved with his family to Warren, R. I., where he has bought a jewelry establishment.

Samuel R. Truesdale has been engaged as overseer of the mule spinning and ring spinning departments of the Ann and Hope Mill, to fill the vacancy caused by the resignation of Charles W. Thornton. Mr. Truesdale comes from Northbridge, Mass.

John T. Abney, superintendent for several years of the Laurens Cotton Mill of Laurens, S. C., has resigned and located in Columbus, Ga., where he will open an office to facilitate making the arrangements for his new cotton mill, to be built in Columbus.

W. L. Robinson has resigned as superintendent of the Manetta Mills at Lando, S. C.

James H. Robertson, of Easthampton, Mass., has succeeded Richard Warren as overseer of finishing at the Warren Cotton Mills, West Warren, Mass.

G. R. F. Prowse, formerly of Philadelphia, and late of St. Johns, Newfoundland, has engaged as dyer with the O. & C. Ansonia Co., Ansonia, Conn.

Frank W. Wood has been elected president of the Brenham (Tex.) Cotton Mills, to succeed D. C. Giddings, Jr.

William Tallant of Fall River, Mass., has accepted the position of overseer of weaving at the Salmon Falls Mfg. Co., Salmon Falls, N. H.

A. H. Robbins of Lancaster, S. C., assumes the duties of superintendent of the new Ide Cotton Mill at Jacksonville, Ala., October 1.

Joseph Morgan has resigned as overseer of French and English drawing at the Atlantic Mills, Providence, R. I.

D. W. Stimson has charge of ring spinning at the Gosnold Mills, New Bedford, Mass.

John H. Holt, formerly of the Totokett Mills, Norwich, Conn., has been appointed superintendent of the Luther Manufacturing Company's mill at Fall River, Mass.

F. T. Radford, superintendent of the Estelle Cotton Mills Company, Selma, Ala., has resigned to accept a similar position with the Stonewall (Miss.) Cotton Mills.

Frederick A. Abbott has resigned as instructor of weaving and designing at the Mississippi Textile School, to accept the position of superintendent of the Meridian, Miss., cotton mills.

Charles W. Thornton, overseer of the spinning department of the Ann and Hope Mill, Lonsdale, R. I., tendered his resignation to take effect October 8. Mr. Thornton has held the position of foreman for the Lonsdale Co. for the past 35 years, and now retires to spend the rest of his life in his new home which he recently built in this city.

L. E. Bentley, superintendent of the Bennett Spinning Co., of the New England Cotton Yarn Company, New Bedford, Mass., has resigned. Thomas F. Glennon has succeeded him.

J. L. Davidson, for several years superintendent of the Dallas Mills, Huntsville, Ala., has resigned and will be succeeded by William Hinchcliffe, who was superintendent several years ago. Mr. Davidson leaves the Dallas Manufacturing Company to become general manager for the Madison Spinning Company.

E. A. French has been appointed superintendent of the Huntsville Cotton Mill Co.'s plant at Huntsville, Ala., succeeding H. Monroe.

W. H. Willis, who has been out West, has returned to the position of overseer of weaving for the Aberfoyle Mfg. Co., Chester, Pa.

R. H. Layton, overseer of carding, has changed from the Louise Mills, Charlotte, N. C., to the Lancaster (S. C.) Cotton Mills.

Joseph Barry, boss carder for the Clinton Mfg. Co., Woonsocket, R. I., has resigned. He is succeeded by his father, George Barry, lately of Danielson, Conn.

J. L. Davidson, superintendent of the Dallas Cotton Mill, Huntsville, Ala., has resigned to become general manager of the Madison Manufacturing Company, this city. William Hinchliffe, formerly superintendent of the Dallas Mills, will come back to Huntsville to resume that position.

George E. Zeller, for many years master mechanic at the Conestogo Steam Mills, Lancaster,

Pa., has been appointed superintendent of the mills in place of the late H. G. McCarter.

John Robinson, formerly with the Overland Cotton Mills at Denver, Col., is now temporarily located at his home in Salisbury, N. C.

Capt. A. M. Fairley has resigned as secretary, treasurer and superintendent of the Tarboro (N. C.) Cotton Mill, and is now general superintendent of the Washington Mills at Fries, Va.

W. M. Sherrard has resigned as overseer of weaving at the Courtenay Mfg. Co., Newry, S. C., to accept the superintendency of the Liberty Cotton Mills. D. A. Wiley, secondhand in the weave room at the Courtenay Mill, has been promoted to overseer of weaving.

B. A. L. Simpson, formerly of Louise Mill, is now overseer of the cloth room of the Hoskins Mill, Charlotte, N. C.

E. M. Wade, formerly overseer of beaming and slashing in the Cliffside (N. C.) Mills, is now with the Proximity Mfg. Co., Greensboro, N. C., in a similar capacity.

T. I. Barber, formerly of New Holland, Ga., now is in charge of the cloth rooms in the Lockhart Mills, Lockhart, S. C.

J. S. B. Patterson, from the McAden Mills, has been appointed superintendent of the Cherryville (N. C.) Mills.

R. H. Layton has changed from the Louise Mills at Charlotte, to the No. 2 Lancaster, S. C., Mill. He holds the position of overseer of carding.

Frank Terrell, formerly with the Manetta Mills, has succeeded R. H. Layton as overseer of carding at the Louise Mills, Charlotte, N. C.

R. Harriman has been appointed general superintendent of the Olympia and Granby Cotton Mills of Columbia, S. C. Mr. Harriman took charge of the Olympia Mills last February. He now has 157,000 spindles and 3,800 looms under his supervision.

Woolen.

Joseph Sykes, designer at the Oakland Mfg. Co., Sykesville, Md., is the new superintendent at the Lawrence-Webster Co., Malone, N. Y.

William Taylor, finisher, is now at the Keegan Mills, Wilsonville, Conn.

F. C. Putney will be superintendent and designer for the new company that will operate the former Riddle Mills at Glen Riddle, Pa.

David Stine, formerly designer at the Globe Mills, Utica, N. Y is now superintendent at the Riverview Worsted Mill, Waterville, Me.

Ruel E. Heywood, dyer, has accepted a position with the Garland Woolen Co., Staffordville, Conn.

Joseph Sykes has engaged as superintendent with Lawrence Webster Co., Malone, N. Y.

T. A. Speak, boss dyer at the Atlantic Mills, Providence, R. I., and his assistants, Thomas Smith and John Holt, have resigned.

John Shea has accepted the position of overseer of carding for the Medway (Mass.) Woolen Co., succeeding Fred Kingsley.

Overseer Reisher, of the cloth department of the Atlantic Mills, Providence, R. I., has resigned.

James J. Grady, East Dedham, Mass., has gone to Wilton, Me., to accept the position of overseer of carding of the No. 1 mill of the Wilton Woolen Co. These mills are running to their fullest capacity. The card room is run until eight o'clock every night to keep up with the looms.

John Bullard has succeeded Thomas E. Ainley as overseer of carding and spinning at the Appleton (Wis.) Woolen Co. The latter has accepted a position with the Paton Mfg. Co., Sherbrooke, P. Q.

John Waugh, Jr., for the past 12 years overseer of carding in the Anderson Mills of the American Woolen Co., at Skowhegan, Me., has resigned, and Richard White of Guilford, Me., is his successor.

Joseph Riley, overseer of carding for the Dunlap Carpet Co., West Philadelphia, Pa., has resigned and accepted a similar position with the well known carpet manufacturing firm of McCleary, Wallin & Crouse, of Amsterdam, N. Y.

Miles Collins is the new superintendent of the worsted department at the Atlantic Mills, Providence, R. I. He was formerly with the Peace Dale Mfg. Co.

John Michaels, overseer of carding for several years past with the Alpha Knitting Co., Schenectady, N. Y., has tendered his resignation in order to accept a similar position with the J. L. & T. D. Peck Mfg. Co., Pittsfield, Mass.

Jacob Murr has resigned as superintendent of the Chambersburg (Pa.) Woolen Mills.

Winifred R. Smith, who has been in the employ of the Lippitt Woolen Company of Woonsocket, R. I., for 18 years, during 12 of which he has filled the position of head designer, has resigned to accept the position of assistant superintendent and designer at the Rhode Island Worsted Company's mill at Indian Orchard, Mass.

Wilfred C. Rodgers, overseer of weaving and designer for the Martinsburg (W. Va.) Worsted & Cassimere Co., has resigned. He will take a much needed rest at his home in Hanover, Conn.

T. Smith, overseer of dressing at the Weybosset Mills of the American Woolen Co., Providence, R. I., has resigned.

Augustus Eddy, designer in the Saranac Mills, Blackstone, Mass., has been appointed superintendent.

C. J. Lincoln has resigned as superintendent of the Pondicherry and Forest Mills, Bridgton, Me. G. W. Overend, of the Riverview Worsted Mills at Waterville, Me., succeeds him.

Harry Hargraves, who for several years has had charge of the dyeing department of the Moosup Mills, Moosup, Conn., has resigned, and gone to Peace Dale, where he has secured a good position.

Fred Paly, formerly with Folwell Bros. & Co., Philadelphia, has accepted a position as overseer of drawing at the Trenton (N. J.) Worsted Mills.

J. Ashworth has secured the position of overseer of French drawing at the Southwark Mills, Philadelphia, Pa., succeeding H. Hewitt.

Francis Hoye, of the Saranac Mill at Waterford, R. I., has been appointed superintendent of the Nasonville Woolen Co.'s mill at Nasonville, R. I., succeeding the late Frank H. Leach.

Charles Legg, superintendent of the Huguenot Mills Company, North Oxford, Mass., has resigned.

W. G. Ratcliffe, formerly superintendent of the Dundee Woolen Mills, Passaic, N. J., has accepted the position of superintendent of the Rivulet Mills, Uxbridge, Mass.

J. F. Moriarty, superintendent of the worsted department for the Beattie Manufacturing Company, Little Falls, N. J., has resigned.

Louis Etchells, formerly with George C. Hetzel & Co., Chester, Pa., as assistant designer, has recently accepted a position as designer with Edward T. Steel & Co., of Bristol, Pa.

Jonathan Ben has secured the position of overseer of spinning and twisting at the Highland Worsted Mills, Camden, N. J.

W. C. Brickner has succeeded his father, the late George H. Brickner, and now has charge of the Brickner Woolen Mills Co., Sheboygan Falls, Wis.

G. W. Overend, late boss weaver and designer at the Riverview Worsted Mills, Waterville, Me., has been appointed superintendent and resident agent of the Pondicherry Co., Bridgton. Me., succeeding C. I. Lincoln.

Knit.

William Vielhauer of Herkimer, N. Y., has accepted a position as boss knitter with the Michigan Central Woolen Co., Centreville, Mich.

C. B. Atkins has accepted a position with N. J. Rich Co., Cleveland, O.

M. M. Cashmore, for many years a foreman in the knitting department of the American Hosiery Co., New Britain, Conn., has been appointed assistant superintendent, succeeding the late George Polson.

John McNamara, overseer of carding for the Broadalbin (N. Y.) Knitting Co., has severed his connection with that company.

John McGinnis has resigned as superintendent of the Athens (N. Y.) Knitting Company, to take the superintendency of the Columbus (Miss.) Underwear Company.

Walter Riley succeeds John Michaels as overseer of carding for the Alpha Knitting Co., Schenectady, N. Y.

Burton B. LaFleur has removed from Manchester, N. H., to Cleveland, O., and accepted a position with the United Knitting Co.

A. D. Hoke, who has been superintendent of H. A. Romberger's knitting mill at Milheim, Pa., has succeeded P. F. Romberger as superintendent of the Romberger Mill at Newport, Pa.

Miscellaneous.

Henry W. Atkinson has been appointed foreman of the cloth inspection department of the Eddystone Manufacturing Co., Eddystone, Pa.

S. Arthur Dodge has resigned as superintendent of the Koted Silk Underwear Co., Millbury, Mass., and is now traveling in England for his health. He has been in charge of the business at Millbury since it was started, nine years ago. William Hurd, who has been assistant superintendent two years, is in temporary charge of the business.

John Sullivan, superintendent of the Union Mills, Fall River, Mass., has resigned to accept a position as cotton expert with the machinery firm of C. E. Riley & Co., Boston.

G. A. Schneebeli, head of G. A. Schneebeli Company and secretary and general manager of the Nazareth Waist Company, was unanimously nominated by the Republican congressional conference as candidate for congress for the twentieth Pennsylvania District.

Deaths.

Abraham Sheuerman, for many years one of Des Moines' most prominent and highly respected citizens, died September 7th. He had long been identified with Des Moines' business interests, having come to this city in 1882 with his brother Leopold to establish the Capital City Woolen Mills. He was best known for his religious and unostentatious charitable work. He retired from active participation in the management of the mills two years ago.

William Walker, head bleacher for the Sayles Bleacheries, Saylesville, R. I., died at his residence in that city recently. He was in his 70th year.

Richard Calvert, one of the best known of the English cotton spinners and manufacturers, died at Preston, Eng., Sept. 21. He was a member of one of the largest firms in the world, employing several thousand persons, and was widely known in the British domains as a leader of the cotton industry.

George Polson, for 25 years assistant superintendent of the American Hosiery Co., New Britain, Conn., died recently. He was born in England 57 years ago. He came to America when he was 18 years old and had been with the above company ever since.

Albert Perkins, for twenty years superintendent of the Lamb Knitting Machine Company, Chicopee Falls, Mass., committed suicide at Biddeford, Me., recently. He was 65 years of age. and his mind had become affected through ill health.

Frank Graves, a manufacturer of knit goods at Needham, Mass., was found dead in the South Terminal Station, Boston, September 19th. He had left his home in apparently good health. His death was doubtless due to heart disease.

William H. Sharples, overseer of the weaving at the King Philip Mill, Fall River, Mass., died recently. Mr. Sharples was 45 years of age, and had been in the employ of the King Philip Mill for seven years, first as assistant overseer and later promoted to the position of overseer. He leaves a widow, five children and many friends to mourn his death.

S. J. Abbott, agent of the Lockwood Cotton Mills, Waterville, Me., died in that city September 6th, at the age of 82 years. Four children survive him.

New Publications.

[Any work noticed under this head can be obtained through the office of this journal.]

Cost Accounts; by C. A. Millener, L. L. B., L. L. M.; The Hunter Rose Co., Ltd., Toronto.

"I fear no manufacturer who keeps a cost account, but I fear the manufacturer who does not. The latter causes me to suffer and ends finally in bankruptcy."

This remark by a prominent merchant to the author of "Cost Accounts" is found in the preface and expresses in a few words the importance of systematic and accurate cost accounts in manufacturing industries. For many years the author was auditor of the Rathbun Company's Industrials and Railways at Ontario and is well equipped by experience to design a scientific system of determining cost. The work has been edited by R. F. Spence, public accountant of Toronto. About a year ago Mr. Spence met the author of "Cost Accounts," and was much impressed with the ease, rapidity and accuracy with which his questions regarding the accounts kept by Mr. Millener were answered and at that time learned that he had written a treatise on cost accounts describing his system. This led to a careful examination of his methods and a decision to publish the work in book form. The incident leading to its publication shows the thoroughly practical character of the work. Following is an abstract of the table of contents: Cost Accounting; The Operating Ledger; Stores; Stock Ledger; Wages and Salaries; Cost Statements.

While not relating directly to textile manufacturing the principles on which the system is based are so clearly explained that the textile manufacturer will be much benefited by a study of the book.

Business Short Cuts; The Bookkeeper Publishing Co., Detroit, Mich. Price $1.00.

In every department of work the difference between theory and practice is well known and every practical man, whether machinist, textile manufacturer, bookkeeper or what not uses methods which expedite business, save labor and which are the result of theory and not of the study of books. Probably nowhere is this more evident than in that of bookkeeping and calculation. This volume of 154 pages has been written to give as far as possible practical short cuts in accounting, bookkeeping, card indexing, advertising, correspondence and general management. The different subjects are too numerous to mention here, even by title, but the following selections from the table of contents will give some idea of the scope of the work: Rules for locating errors in trial balances; figuring percentages; some arithmetical short cuts; sectionalization and controlling accounts; bond purchase formula; arithmetical oddities; quick system for filing orders; fingering cards rapidly; scheme to insure quick handling of correspondence; number of words in a square inch; zinc etching; how to determine the finish of paper; checking returns on form letters; calculating the weight of paper; saving postage; perpetual inventory system; the office man's time.

Designs for Drawing and Weaving Schools, Manufacturers and Designers (Vorlagen-Blatter fuer Zeichen and Webschulen, Fabrikanten und Musterzeichner); by Thomas Weigner, Director of the Weaving School at Warnsdorf, Austria. Price $18.00; with samples of the fabrics, $50.00.

These thirty colored plates are designed not only for the purpose of instruction in weaving and designing schools, but also for use in industrial establishments. They begin with sketches illustrating the principles of design. These are followed by designs suitable for upholstery fabrics and other textile materials. Some very fine examples of shaded designs are included in the collection. Specifications for the fabrics including material, set, pattern, etc., are given for each plate.

Handbook of Weaving for Weaving Schools and Manufacturers (Handbuch der Weberei zum Gebrauche fuer Webeschulen und fuer Praktiker); by Nicolaus Reiser and Jakob Reintgen; Georg D. W. Callwey, Muenchen. Price $18.00.

This is an elaborate treatise on the art of weaving decorative fabrics. It is profusely illustrated with weave drafts and designs and treats of the weaving of damask and upholstery goods, shawls, carpets, curtains, altar cloths, broche effects, slipper cloth, fabrics for portraits, passementerie, chenille, leno, Gobelin tapestry, endless felts, suspenders, elastic fabrics, feather and wood fabrics, wire cloth, bead decorations, bobbin lace, tulle for curtains, braid, ribbons, relief fabrics and embroidery.

Business Literature.

The Nevershrink Process; by Charles H. Heyer, Real Estate Trust Building, Philadelphia, Pa.

A neat and attractive booklet. The first page states just what it will do, that is, prevent shrinking of wool and woolen goods. It continues by stating some of the methods that have been used and failures that followed, thus justifying the distrust and prejudice with which all such announcements are regarded, both by woolen trade and the public. The book states that the Nevershrink has been proven by practice; that fabrics treated by this process have undergone every sort of test for years without showing a trace of shrinkage or felting; that the process works no injury to the fabric and does not detract from its durability, strength and wearable qualities; that the goods retain their original "handle," elasticity, color and strength.

The process is simply an additional operation in the manufacturing and requires additional but inexpensive machinery. It can be applied to the stock or woolen goods at any stage of the manufacture.

The "Nevershrink Process" is not sold upon a royalty basis, but the right to use it is granted at a moderate price, which includes a thorough instruction of the purchaser in its use and application, as well as in the theory upon which it operates, so that those taught can apply it practically with perfect success.

A History of Wool Oils; E. F. Houghton & Co., Philadelphia and Chicago.

This pamphlet has been prepared by Chas. Everly Carpenter, the well known expert upon oils for industrial purposes. It contains much useful information regarding oils and should be read by every woolen manufacturer. Certain of his statements will probably not be pleasing to some dealers in oils, but they all bear the imprint of careful investigation and are evidently based upon experience. The pamphlet is sent free upon request. Earlier attention will be paid to applications if addressed to P. O. Box 3068, Station Q, Philadelphia.

The Hurricane Stocking Dryer; Philadelphia Drying Machinery Co., Philadelphia, Pa.

An illustrated pamphlet describing the Hurricane stocking dryer which is so well known to our hosiery manufacturers. A copy of the pamphlet will be sent to any one upon request.

The Alumni Association of Philadelphia Textile School.

The annual report of the Alumni Association has been issued in most attractive form. It contains a list of active, associate and honorary members and a report of the proceedings held at commencement time in June, together with the papers read. Every man who has ever attended the school who is not a member of this association ought to become a member.

A B C Fans and Blowers; American Blower Co., Detroit, Mich.

An illustrated folder containing a description and price list of the different types of A B C fans and blowers manufactured by this concern.

A B C Vertical Engines; American Blower Co., Detroit, Mich.

Three pamphlets containing a description and price list of the various types of A B C vertical engines.

Clemson Agricultural College, Clemson, S. C.

An illustrated catalogue of the Clemson Agricultural College. This institution includes a department of textile industry of which Prof. Beaty is the director. The catalogue gives particulars regarding this branch of instruction, which at present is in a very flourishing condition.

Encolline.

J. A. Del Solar, 108 Fulton St., New York, sole agent for the United States and Canada for Encolline (The Twentieth Century Sizing), has published a very attractive booklet, containing information about this product, together with a number of useful receipts for sizing and loading, as well as information on methods in use abroad. It will be mailed upon request to interested parties.

Batten and Hayes Card.

The Barker Mill, Auburn, Me., is applying the Batten and Hayes attachment to a 45-inch Saco and Pettee card. This attachment consists in an additional top stripper above the cylinder.

The Harris System of Smoke Prevention and Fuel Economy.

This system has been installed with unvarying success in a number of Southern plants, among them some textile mills, and now Northern and Eastern manufacturers will note with interest its successful installation in the Crown Mills, Marcellus, N. Y. This representative plant is up to date in its equipment yet conservative, and does not adopt a new thing simply because it is new, especially a furnace setting, the removal of which, in the event of its being unsatisfactory, would cause much annoyance. A number of changes have recently been made at the Crown Mills' plant, and boilers installed with the Harris system. The following letter just received from the president of the Crown Mills by Dr. Harris indicates the success which had been anticipated:

Office of Crown Mills.
Marcellus Woolen Mills, Marcellus, N. Y.
Sept. 24th, 1904.

Dr. J. B. Harris, Nashville, Tenn.

Dear Sir:—We have started two boilers with your furnaces,—the amount of smoke is very much less—I should say 70 per cent less. This of itself is a great thing. The boilers steam easily, and I am satisfied we are making an economy in fuel. I will let you know later how we get on—but I am perfectly satisfied it is well worth the cost of putting in.

Yours truly,
EDWARD MOIR,
President.

At this early stage the exact data is not available, but the visible evidence of prevention is apparent to every one, and absence of smoke means perfect combustion and fuel economy. Manufacturers who naturally hesitate about the adoption of new setting until its success is demonstrated may now feel assured that the Harris system is no longer an experiment, for the experience of the Crown Mills is only similar to that of many large plants in the South.

Fall Trip to St. Louis.

This is the time of the year when traveling is a delight and the journey to St. Louis is one of the best trips imaginable. The great Exposition is a vast store-house of useful and instructive information and the completeness of the details in every branch is little short of astonishing. There are exhibits from every land and region and no matter in which branch or building you may visit you will find amazing things. The route to St. Louis, which leads over the New Jersey Central is one of the best inasmuch as there is an opportunity for stop-over at Baltimore and Washington and also privilege of visiting the famous battle fields of Virginia. There are also circuitous routes which the New Jersey Central can offer all of which have many attractive features and if you are interested drop a line to C. M. Burt, G. P. A., New Jersey Central, New York City, for information.

Collapse of a Water Tank.

The following interesting account of the collapse of a water tank used for a sprinkler supply in a New England mill is given by the Boston Manufacturers Mutual Fire Insurance Co.: "The collapse of this tank resulted from the bursting of the flat hoops which had rusted on the inside almost entirely through in many places. The tank has been in service nine years and is said to have been painted twice in that time. The hoops appeared from the outside to be in good condition. The tank was being filled when the accident occurred. The master mechanic had noticed by a gauge which indicated the tank pressure that the water was about six feet lower than usual, and having started the pump to fill the tank, was watching to see the tank overflow, when he observed muddy water coming from the bottom. He saw the lower hoops snap and then ran for shelter. Apparently the hoops burst first on the side toward the mill, for the tank cover landed on that side of the platform and did not come down. Some of the staves and a good deal of water landed on the roof of the building, springing several of the roof trusses and breaking two small holes through the roof plank. A small hole was also made in the roof of No. 4 Building."

The St. Louis Exposition.

During 1904 St. Louis stands foremost among the cities of the world. The gigantic Exposition which everybody is talking and reading about has popularized the Missouri city; and where formerly ordinary commendation in regard to St. Louis was heard, now unstinted praise is poured forth conceerning the beauty and hospitality of the city itself. Ideally laid out, St. Louis has every advantage as an exposition city; and now that the hottest month at St. Louis has passed, the fair will be better patronized than ever.

It is not true that extortionate prices prevail at St. Louis. In fact, the hotel prices are as moderate as one would expect them. Hotel prices are as advertised, and nice, clean, comfortable rooms in private houses can be procured very reasonably. The city of St. Louis has done well in strictly enforcing the law against all persons who unjustly impose upon strangers in money matters, and it has had a wise and salutary effect.

As to the Exposition itself, well, the general opinion is "the grandest, most magnificent display ever produced." The wonderful "Pike," with its hundreds of interesting entertainments and features; the magnificent art display; the beautiful Plateau of States, where the different states have representation; the large list of foreign exhibits and illumination at night, which far surpasses anything of the kind heretofore attempted, are a few of the noteworthy features. In order to get a detailed idea of the St. Louis Exposition, send to the General Passenger Department, Boston & Maine Railroad, Boston, for their beautiful illustrated booklet. It will be mailed free upon receipt of address.

Machinery Bargains.

Arthur Stead, 227 Chestnut St., Philadelphia, deals in both new and second-hand woolen and worsted machinery, mill supplies, etc., and offers bargains to parties wishing to buy. He also carries parts on hand, which can be delivered at once on receipt of orders. Mr. Stead is a good judge of machinery and has wide connections, so that parties in the market for woolen and worsted machinery will do well to send for his list and describe what is wanted.

"The Handiest Thing About the Mill."

That is what a knit goods manufacturer said the other day in speaking of the portable hoist sold by John E. Larrabee, Amsterdam, N. Y. It is just as handy in a cotton or woolen mill or any other kind of a mill or warehouse when cases and bales or heavy packages have to be handled. 200 to 250 pounds is about all that a couple of men can handle, and then only to a limited height. With this portable hoist one man can easily lift 800 pounds. He can put the goods on the hoist himself, lift them to required altitude and get them off. The machine is on rollers, can be moved anywhere, and can be turned in every direction. It is a great labor saver, as scores of textile mills have found out, and any department where there is much handling and piling of cases and bales would find it a most useful device, and well worth the price.

The Angora Goat in Mexico.

William Headen, the American consul at Pueblo, Mexico, reports as follows on the Angora goat in Mexico:

The ordinary domestic goat, so well known in the United States, is the species raised throughout Mexico. It is valued for its pelt, its tallow, and its flesh, both fresh and dried. As yet no use has been made of either horns or hoofs. In the vicinity of San Luis Potosi the entrails have been spun into long strings of so-called catgut, and the finer and more delicate strings have been profitably exported by mail, in small parcels, to Chicago and New York.

The Angora breed is not appreciated in Mexico, though it finds favor in western Texas, near the Mexican border. If of pure blood and if neglected during the season for pulling, it is apt to leave its hair scattered upon the scrub and brush. Furthermore, whether pure or crossed, it is more of a sheep than a goat, its skin being less than one fourth as valuable as ordinary goatskin. This destroys the value of the Angora in Mexico.

The ordinary goat, when slaughtered, yields 4 pounds of dried meat and 6 pounds of refined tallow, which, together with the skin, are worth here in the home market, in Mexican silver, $3.46 ($1.57 in gold)—the 4 pounds of dried meat, at 20 cents, 80 cents; the 6 pounds of refined tallow, at 16 cents, 96 cents; the cured skin, 2 pounds, at 85 cents, $1.70. The original cost of goats for breeding purposes is, on an average, $2.50 a head in Mexican silver ($1.10 in gold). The common goat, well cared for, is hardy and well suited to the country. It breeds four times in three years.

Loom Reeds.

Stewart & Sons, of 1627 Mascher St., Philadelphia, have been manufacturing loom reeds for many years. They have a large Philadelphia clientage, and are prepared to give prompt attention to orders anywhere in the country, feeling confident that their work will give satisfaction.

The William Schofield Company, Manayunk, Philadelphia, has recently placed its automatic willowing and dusting machines in the mills of John T. Bailey & Co., cotton rope manufacturers, of Philadelphia; George Grayson, manufacturer of merino yarns at Darby; James H. Lee, wool yarn spinner, of Philadelphia; H. L. Dougherty & Co., Philadelphia, and the company has also installed its latest improved intermediate feeds in the large mill of Thomas Henry, Jr., Philadelphia, all of which are giving perfect satisfaction.

Enlarging Their Works.

The Goulds Manufacturing Company, Seneca Falls, N. Y., have bought a large tract of land adjoining their No. 2 works, comprising about 40 acres. This purchase is for the enlargement, extension and concentration of the entire works of the company along the line of the Central Railroad. The necessity for increased and more convenient facilities for manufacturing has been felt for a long time past, and the whole scheme of enlargement contemplated by the Goulds Co. is on an extensive scale, and when completed will add greatly to the manufacturing interests of the town.

"Hugtite" Belts.

Messrs. Josiah Gates & Sons, Lowell, Mass., are bringing out a special line of belting particularly adapted to textile work, and especially in wet or steamy places. They have given this belting the suggestive name of "Hugtite," for that is just what it does. It is a waterproof belt, and has given the best of satisfaction. They invite interested parties to send for samples.

Softening Oil.

The Soluble Softening Oil manufactured by the Arabol Mfg. Co., 100 William St., New York, is very popular with textile manufacturers, who find it a fine softening and sizing oil. The manufacturers claim it is always reliable and remains in sweet condition both summer and winter, and is very easily handled.

The American Drying Machinery Co., Inc., Westmorland and 19th Sts., Philadelphia, advise us that they have received so many orders recently for the 20th Century machinery which they make that they are working overtime, and report that business seems to have revived very much in the past few weeks.

Victor Shuttle Check Sold to Crompton & Knowles Loom Works.

Crompton & Knowles Loom Works announce that they have purchased the entire business and patents of the Victor Shuttle Check Co. of Auburn, N. Y., and will hereafter manufacture all styles of shuttle checks formerly made by that company. Inquiries, orders or requests for sample pairs to be sent on approval should be addressed to them, either at Worcester or at their Providence, R. I., or Philadelphia branches.

The Longer Used the Better Liked.

The steel thread boards manufactured by L. T. Houghton of Worcester, Mass., have now been on the market for several years, and manufacturers who put them in two and three years ago have had every opportunity to test them under all conditions. Re-orders are coming in fast from such concerns. Mr. Houghton reports that he has orders for many thousands of the steel boards and his works are very busy. The Otis Company of Ware, Mass., after using about 13,000 of the Houghton thread boards for two years, has ordered steel thread boards with metal back rails to take the place of 25,000 wood thread boards. The Courtney Mfg. Co. of Newry, S. C., has thrown out 20,000 wood thread boards to replace with Houghton's steel boards and is greatly pleased with the change. A re-issue of one of Mr. Houghton's important patents has recently been made, which further protects him against infringement.

The Vacation Season.

The St. Louis Exposition is no doubt the objective point for numerous vacationists this season; and surely it is well worth one's while to journey to this gigantic exposition. But there are thousands of persons in the East who are quite content to take their season's rest in their usual summer abode—in Northern New England, midst the lakes. rivers and seashore of New England which nature has decorated with perfect grace; in the peaceful vales of the White Mountains, or the health-giving mountain towns, or away in the farther recesses of Maine's pine forests or in the woods of New Brunswick. Lakes, Rivers, Mountains and Seashore are the portfolios containing beautiful views of these sections, and the descriptive books "All Along Shore," "Lakes and Streams," "Among the Mountains," "Southeast New Hampshire," "Southwest New Hampshire," "Valley of the Connecticut," "Merrimack Valley," "Monadnock Region," "Lake Memphremagog and About There," "Hoosac Country & Deerfield Valley," and "Central Massachusetts." These descriptive books give a detailed account of the various regions and are copiously illustrated. They will be mailed to any address upon receipt of two cents for each book, and the portfolios will be mailed upon receipt of six cents in stamps for each book by the General Passenger Department, Boston & Maine Railroad, Boston.

The Cotton Industry.

Cotton has been employed in the manufacture of yarn and cloth from the most remote antiquity. The Bible mentions it; Herodotus, Strabo, Pliny as well as other ancient writers speak of it and it has been found in the wrappings around the mummies in the tombs of Egypt. Nevertheless the first articles of clothing made from cotton did not appear in Europe until the time of the Crusades and were then considered objects of great value. As trade with the Orient increased the importation of these cloths became more frequent and it is believed that the weaving of cotton began in Venice about the beginning of the thirteenth century, but very probably from imported yarn. It was not until the sixteenth century that the manufacture of cottonades was begun in France at Rouen in 1534, at Lyon in 1580 and at Troyes in 1582. The industry which was then in a very crude state was introduced into England and the Low Countries about the same time.

Thomas Highs, a manufacturer of combs at Leigh, Lancashire, was the first inventor of the spinning frame which was the result of patient and persistent work begun in 1760. He was aided by James Hargreaves, a mechanic of Stanhill. Both these men died in poverty, while a former barber of Preston, Richard Arkwright, who had developed their discoveries and obtained the confidence of capitalists, created industrial establishments which gave him an enormous fortune and great honors.

It was in the vicinity of Amiens that the first spinning of French cotton was established in 1773 and in 1801 the government opened a competition of the best machines for spinning the fibre.—l'Industrie Lainiere.

Ontario, St. Thomas. It is reported that H. S. Johnson, formerly of Gilbertville, Mass., is starting a knitting mill.

Inelastic Ramie.

One test in mill practice goes to show that ramie may be made into belt-ropes with some advantage. The fibre is affected less by climatic influences than are some of its competitors; and as no very sharp bend is formed, the rope is little liable to break by cracking. In a large worsted mill ramie twine was tried as a substitute for cotton spinning-band, with results good to a certain degree: indeed, except that at the joinings the bands broke for want of elasticity, the material answered excellently. To avoid the disadvantage, an effort was made to produce ramie twine in endless loops of the required dimension; and some difficulty was encountered in obtaining these of exactly similar size. This being surmounted, work proceeded until certain of the tighter bands would break; and to put on a new one, possibly about the middle of the frame, it was necessary to move the entire series along. This drawback was held fatal, and the use of ramie was discontinued in the important mill in question. Abroad, in such climates as that of French India, the tendency of ramie bands or tapes to break is cheerfully disregarded in consideration of their indifference to the dry heat of the day and the moist warmth of the night. Because the fibre does not stretch when pulled, nor regain its shape and bulk after pressure, a dozen disabilities arise. The leading distributers of knitted goods, for example, decline to introduce ramie hose to their patrons for this reason, and its typical lack of resilience forbids the employment of the fibre for the manufacture of the pile fabrics for which it would be otherwise so well suited.—Textile Mercury.

The Baltic (Conn.) Mills Co. have contracted for a large economizer, the order having been placed with the Green Fuel Economizer Co., the sole makers in the United States of this well known specialty.

Recent Textile Patents.

BILLIARD CLOTH. Compound 767,922. Moses Bensinger, Chicago, Ill., assignor to the Brunswick-Blake-Collender Co., Chicago, Ill.

BLEACHING AND DYEING APPARATUS. 767,563. August Holle, Dusseldorf, Germany.

CARDING MACHINE STOP MECHANISM. 767,965. James W. Scott, Warren, Me.

CLOTH CUTTER. 767,552. George P. Eastman, Toronto, Canada.

CLOTH SINGEING MACHINE. 770,274. John Edmunds, Waltham, Mass.

COMBING MACHINE. Wool. 768,381. Theodore K. Lee, Brooklyn, N. Y., assignor of one-half to Louis H. Ohlmann, Brooklyn, N. Y.

COTTON OPENERS. Evener Mechanism for. 767,750. William J. Hall, Pawtucket, R. I.

COTTON PICKER. 767,611. James W. B. Turk, Poteau, Ind. Ter., assignor of one-half to William A. Welch, Jr., Poteau, Ind. Ter.

COTTON PICKER. 768,400. James K. Piper, Wilmerding, Pa.

BOLL WEEVILS. Compound for Destroying. 768,806. George C. Kitchen, Houston Heights, Texas, assignor of one-half to J. B. Brockman, Houston, Texas.

BRAIDING MACHINE. 767,376. James D. Bishop, New York, N. Y.

COTTON PICKER GRID BAR. 768,409. Albert A. Sweet, Fall River, Mass.

FABRIC. Apparatus for Handling Tubular. 769,648. Charles W. Gove, Manchester, N. H.

FABRICS WITH FLUID SUBSTANCES. Machine for Impregnating. 768,059. Henry A. Mann, Albany, N. Y.

FABRIC PRESSING AND FINISHING MACHINE. 768,690. Tom Pratt, Shipley, Charles King, Bradford, and James E. Hammond, Baildon, England.

FABRIC SPLITTING MACHINE. Duplex Woven. 768,348. Benjamin S. Smith, Paisley, Scotland.

FIBROUS PADS OR BATTING. Making. 768,599. Gustav Goldman, Baltimore, Md.

BOBBIN. 768,725. Victor Belanger, Sea View, Mass.

This invention has relation to bobbins and it has for its object the provision of a bobbin which may be employed in connection with ring-spinning mechanism by which the yarn may be built thereon in short courses, beginning at the top with the main traverse downward.

The invention also provides improvements in bobbins whereby they will readily centre themselves in rotation and effect an even strain on the yarn during the spinning or twisting operation.

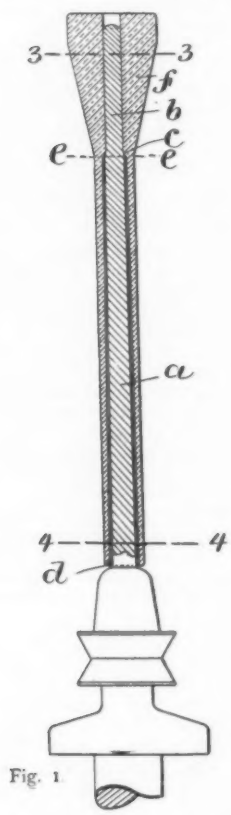


Fig. 1.

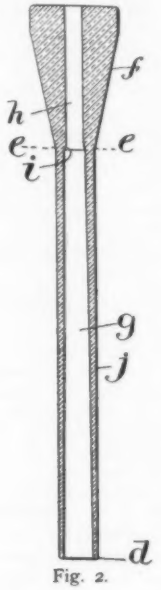


Fig. 2.

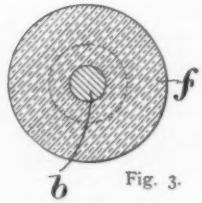


Fig. 3.

On the accompanying drawings, Figure 1 represents in vertical section a spindle blade with this improved bobbin thereon. Fig. 2 represents the bobbin in section and shows it as detached from the spindle. Fig. 3 represents an enlarged section on the line 3 3 of Fig. 1.

BOBBIN FOR TWISTING AND DRYING YARNS. 767,438. Georges Poure, Boulonge-sur-Mer, France.

LOOM FILLING DETECTING MEANS. 769,679. Arthur E. Benson, Magnolia, Miss., assignor to Draper Co., Hopedale, Mass.

LOOM FILLING FEEDER. Filling Replenishing. 769,573. E. S. Stimpson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM JACQUARD APPARATUS. 767,942. Walter H. Hodgson, Philadelphia, Pa.

LOOM JACQUARD MACHINE. 770,258. Geo. H. Brown, William R. McMurray and M. C. Andrews, Belfast, Ireland.

LOOM JACQUARD MECHANISM. 769,283. Joseph Wadsworth and Cornelius Schrier, Paterson, N. J.

LOOM LAY BEARING SUPPORT. 769,487. John McFethries, Springfield, Mass.

LOOM LET OFF. 767,937. Alonzo R. Gossett and Berry R. Hicks, Henrietta, N. C.

LOOM MOTION. Jumper or Half-and-Return. 770,067. William A. Hilton, Utica, N. Y.

LOOM PICKER CHECKING MEANS. 769,669. Edward S. Stimpson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SELVAGE MOTION. 769,921. Charles F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHED FORMING MECHANISM. 770,495. Randolph Crompton and Anthony J. O'Reilly, assignors to Crompton-Thayer Loom Co., Worcester, Mass.

LOOM SHEDDING MECHANISM. 768,144. Charles F. Perham, Amesbury, Mass., assignor to Perham-Stickney Co., Amesbury, Mass.

LOOM SHEDDING MECHANISM. 770,168. Randolph Crompton, Worcester, Mass.

LOOM SHUTTLE. 767,379. John C. Brooks, Middletown, Conn., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE. 769,845. Merrill O. Steere, Pawtucket, and Simon W. Wardwell, Providence, R. I., assignors to the Brindle-Steere Co., Portland, Me.

LOOM SHUTTLE BOX. 768,900. Arthur Heaton, Liversedge, England.

LOOM SHUTTLE BOX CONTROL MECHANISM. 770,441. Christopher Peck and Walter W. Peck, West Didsbury, England.

LOOM SHUTTLE CHECKING MEANS. 769,179. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE. Self Threading. 768,218. Charles W. Frost, Waterville, Me., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE. Self Threading. 769,914. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM STOP MOTION. 770,467. Henry J. Jarry, Worcester, and John Regan, New Bedford, assignors to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM TAKE-UP MECHANISM. 769,580. Gustave E. Anderson, Philadelphia, Pa., assignor to the Fairmount Machine Co., Philadelphia, Pa.

LOOM TILTING REED MECHANISM. 770,454. Edward W. Davenport, South Framingham, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM FOR TUFTED OR PILE FABRICS. 769,851. Carl Vorwerk, Barmen, Germany.

LOOM WARP STOP MOTION. 768,651. Joseph Chaine, Vierzon, France.

LOOM WARP STOP MOTION. 769,174. Valmor A. Ledoux, Worcester, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM FOR WEAVING LOOPED OR PILE FABRICS. 769,062. John R. Dennis and James H. Fawthorp, Halifax, England, assignors to John Crossley & Sons, Ltd., Halifax, England.

LOOM FOR WEAVING PILE FABRICS. 768,223. William G. Hartley, Amesbury, Mass., assignor to Hartley Loop Weave Co., Amesbury, Mass.

LOOM FOR WEAVING TERRY FABRICS. 770,689. Joseph H. Margerison, Philadelphia, Pa.

LOOM FOR WEAVING VELVET. 768,222. William G. Hartley, Amesbury, Mass., assignor to Hartley Loop Weave Co., Amesbury, Mass.

LOOM WEFT REPLENISHING MEANS. 767,934. Joseph A. Gendron, Nashua, N. H.

LOOM WEFT REPLENISHING MECHANISM. 767,425. Felix O'Donnell, Pawtucket, R. I., assignor of one-half to Susan A. Brown, Pawtucket, R. I.

LOOM WEFT REPLENISHING MECHANISM. 769,865. Conrad Hamig, Augsburg, Germany.

MORDANTING. 769,954. Armand Muller-Jacobs, Richmond Hill, N. Y., assignor to Cosmos Chemical Co.

PICKERS. Feed Roller for Rag. 769,680. Louis Bredannaz, Toronto, Canada.

This invention relates to improvements in feed-rollers for rag-pickers and its object is to provide a feed-roller that will feed the stock to the picking-cylinder and hold it in position to be operated on by the picking-cylinder throughout the entire

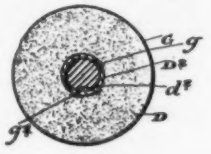


Fig. 1

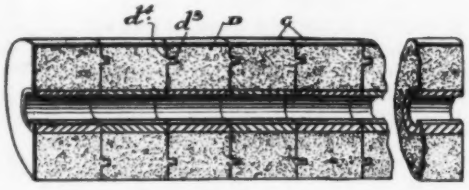


Fig. 2

length of the feed-roller, notwithstanding any inequality in thickness of the stock fed throughout the length of the feed-roller. It consists, essentially, of a feed-roller comprising an annular sectional cover, the sections of which have yielding peripheral surfaces and are provided with interlocking portions formed on the contacting edges of the sections and having means for preventing the rotation of the sections upon the central spindle, the parts being arranged and constructed in detail.

Figure 1 is a transverse sectional view of the roller. Fig. 2 is a longitudinal section through the feeding-roller of a rag-picker machine, such roller being intermediately broken away.

PILE FABRICS. Mechanism for Cutting Loops of. 768,225. William G. Hartley, Amesbury, Mass., assignor to Hartley Loop Weave Co., Amesbury, Mass.

SHUTTLE. 768,408. Robert H. Sterrett, Paterson, N. J.

SHUTTLE LOCKING MECHANISM. 769,801. Joshua P. Johnson, Brunswick, Me., assignor to Draper Co., Hopedale, Mass.

SPINDLE. 768,555. Victor Belanger, Sea View, Mass.

SPINDLE. 768,724. Victor Belanger, Sea View, Mass.

SPINDLES. Bobbin Clutching Means for Rotatable. 770,402. Frank H. Thompson, Milford, Mass., assignor to Sawyer Spindle Co.

SPINNING APPARATUS. Ring. 768,846. George O. Draper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

SPINNING FRAME THREAD GUIDE. 770,123. George Skinner and Frederic Hardman, Bolton, Eng.

SPINNING SPINDLE. 768,074. John E. Prest, Worcester, Mass.

SPINNING AND TWISTING MACHINE. 768,442. George W. Foster, Westfield, Mass.

SPINNING MACHINE Tension Regulator. 765,596. Charles de Rossetti, Roubaix, France.

SPINNING RING. 765,241. Harrison B. Hoyle, Worcester, Mass.

SPINNING SPINDLES. Bobbin Clutching Means for. 764,744. Clarence E. Metcalf, Hopedale, Mass., assignor to Sawyer Spindle Co.

SPOOL. 764,206. George H. Reynolds, Mansfield, Conn.

SPOOLER GUIDE. 764,353. Henry Lawrence, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

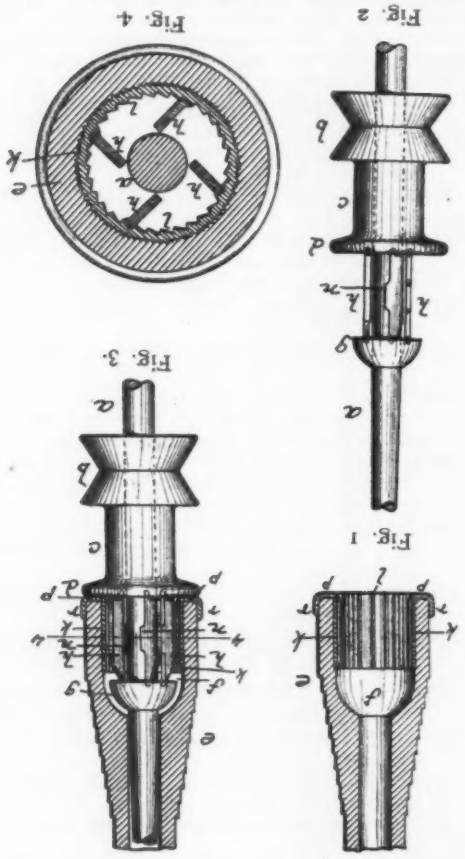
TWISTING APPARATUS for Yarn. 764,632. Alonzo E. Rhoades, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

SPINNING SPINDLE AND BOBBIN. 767,011. John E. Prest, Worcester, Mass.

This invention relates to rotable spinning spindles and bobbins, and particularly to that class of spinning apparatus in which the bobbin is connected with and rotated by the spindle by the operation of centrifugal action upon a clutching or engaging mechanism intermediate of the bobbin and the spindle.

In this invention the clutches or engaging devices are pivotally sustained in substantially vertical positions between the spindle and the bobbin, and when motion is imparted to the spindle they are rotated horizontally on their axes by the centrifugal action produced by the rotation of the spin-

dle or by said centrifugal action aided by atmospheric resistance until the outer edges of said clutches are thereby brought into engagement with



teeth, preferably ratchet-shaped, on the inner face of a ferrule which lines the inner walls of the chamber in the head of the bobbin, whereby the spindle and bobbin are connected and rotation imparted to the latter.

SPINNING MACHINE. 765,319. Arthur L. Mathewson, Omaha, Neb., assignor of one-fourth to Charles W. Barney, San Francisco, Cal.

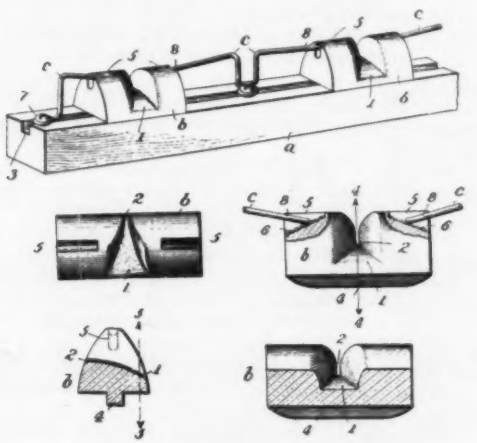
SPINNING MACHINE FEED ROLL. 764,980. Manton T. Bentley, York, Pa., assignor of one-half to York Silk Mfg. Co., York, Pa.

SPOOLING MACHINE THREAD GUIDE. 763,995. John R. Mitchell, New York, assignor to Mitchell-Bissell Co., New York, N. Y.

The object of the present invention is to produce a thread-guide for spooling-machines which is readily adjustable and which will remain in position after adjustment.

A further object is to improve the guide so that it will more accurately deliver the thread to the spool.

The guide-blocks, b, are formed of porcelain, glass, or other suitable hard material. Each guide-block is provided with a transverse guide-groove which is substantially V-shaped in plan, being wide at its receiving end, 1, and converging to a narrow throat, 2, at its delivery end. The delivery part of the guide-groove is at the extreme end of said groove at the rear side of the block, b, and it is thus located as near as possible to the spool upon which the thread or yarn is to be wound.



SPINNING OR TWISTING MACHINE Thread Guide Support. 12,263. Lewis T. Houghton, Worcester, Mass.

TWISTING APPARATUS. Yarn. 770,244. Alonzo E. Rhoades, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

WARP BEAM TENSION DEVICE. 768,464. Gottlieb Keller, New York, N. Y.

WOVEN FABRIC for Underclothing, Etc. 768,387. Fritz Lots, Friedrichsroda, and Ludwig Simons, Neumunster, Germany.

WOVEN INTERLINING FABRIC. 769,790. George S. Cox, Fitzwatertown, Pa.

WARP YARN SLASHER. 764,767. Alonzo E. Rhoades, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

WOVEN FABRIC Formed Chiefly of Leather Fibres. 763,737. William H. Drury, Waltham, Mass., assignor to George Tod Ford, Washington, D. C.

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YARN FORMED OF FIBROUS MATERIALS. William H. Drury, Waltham, Mass., assignor to George Tod Ford, Washington, D. C.

YARN FROM FIBROUS MATERIALS. Machinery for Manufacturing. 763,378. William H. Drury, Waltham, Mass., assignor to George Tod Ford, Washington, D. C.

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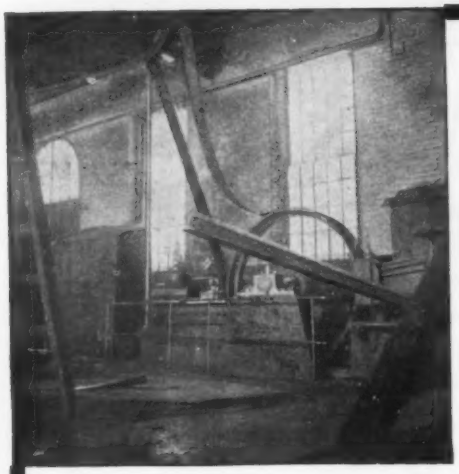

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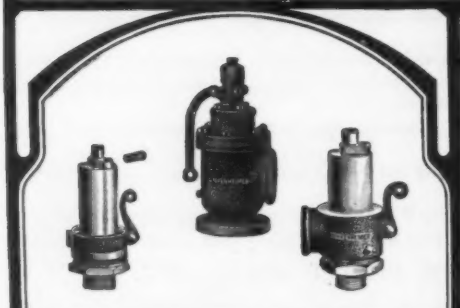

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Mass. Fan Co.
Parsons Mfg. Co.
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Mason Brush Works.

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Smith, Jas., Woolen Machinery Co.

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Arlington Mch. Wks. (Arthur Birch, prop.)
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Morris & Co.

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Roessler & Hasslacher Chemical Co.
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Reeves Pulley Co.
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Atlas Copper Stamp Works.

Copper Work for Dyers.
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Barker, James.
Butterworth, H. W. & Sons Co.
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Crompton-Thayer Loom Co.
Cohoes Foundry & Machine Co.
Coldwell-Gildard Co.
Curtis & Marble Machine Co.
Draper Company.
Easton-Burnham Co.
Elliott & Hall.
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Firth, William, Co.
Houghton, L. T.
Howard & Bullough American Mach. Co.
Kilburn, Lincoln & Co.
Kitson Machine Co.
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Lowe, S. C.
Lowell Machine Shop.
Mason Machine Works.
Metallic Drawing Roll Co., The.
North Chelmsford Machine Co.
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Philadelphia Textile Machinery Co.
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Riley, C. E. & Co.
Saco & Pettee Machine Shops.
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Vacuum Dyeing Machine Co.
Whitin Machine Works.
Woonsocket Machine & Press Co.

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Howard & Bullough American Mach. Co.
Kitson Machine Co.
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Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.

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Bosson & Lane.

Cotton Waste.
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Blaisdell, S., Jr., Co.
Charles, W. B.

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Tifft Bros.

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Dixon, Jos., Crucible Co.
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Kennedy, Thos. (Cutters, etc.).

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Whittle, Jas. H.

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Bull, William C.
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Firth & Foster Co.
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Ingrahamville Dye Works.
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Bischoff & Co.
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Cassella Color Co.
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Allis Chalmers Company.
General Electric Co.
Mechanical Appliance Co.
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Mass. Fan Co.
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Electric Lamps.
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Electric Lighting.
Allis Chalmers Company.
General Electric Co.
Sturtevant, B. F., Company.
Westinghouse Electric & Mfg. Co.

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Allis Chalmers Company.
General Electric Co.
Mechanical Appliance Co.
Sturtevant, B. F., Company.
Westinghouse Electric & Mfg. Co.

Elevators.
Cohoes Foundry & Machine Co.
Jeffrey Manufacturing Co.
Morse, Williams & Co.
Salem Elevator Works.

Employees' Time Recorders.
Pettes & Randall Co.
Riggs & Brothers.

Engravers.
Smith Bros.

Exhaust Heads.
Burt Manufacturing Co.
Pittsburgh Gage & Supply Co.
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Garry, Brown & Co.

Fans—Exhaust and Ventilating.
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Feed Water Heaters.
Green Fuel Economizer Co.
Roberts Filter Co.
Scaife, W. B. & Sons.

Feed Water Pumps.
Goulds Mfg. Co.
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Scaife, W. B. & Sons.

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Scaife, W. B. & Sons.

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Fire Brick.
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Fire Extinguishers.
Badger, E. B. & Sons Co.

Fire Hose.
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Fire Hydrants.
Norwood Engineering Co.

Fire Proof Doors and Windows.
Lupton's, David, Sons Co.

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Fairbairn-Lawson-Combes-Barbour, Ltd.
Haskell-Dawes Mach. Co.
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Hood, R. H.
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Forges.
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Forwarders.
McKeon, John F.

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Increase Your Production

Your employees will turn out more work when they have good air to breathe with ample heat in winter and proper ventilation in summer

Use the

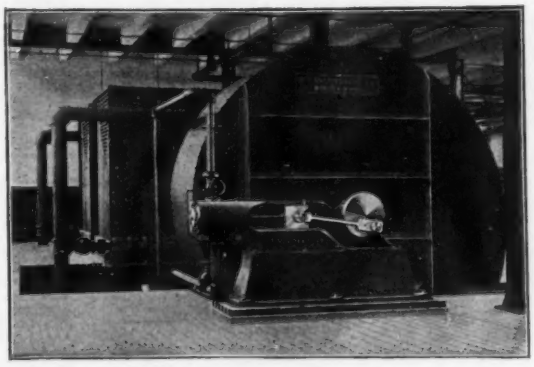
Sturtevant System

of

HEATING and VENTILATION

A centralized plant under one man's control.

No scattered steam piping, no hammering of steam pipes, no leaky joints.



A forced circulation of air by means of a fan.

Operation independent of weather.

Exhaust steam utilized.

B. F. STURTEVANT CO.

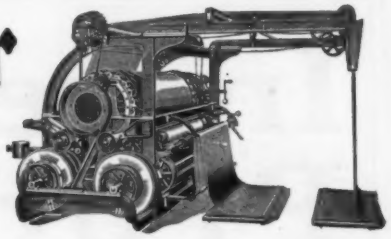
Hyde Park, Mass.

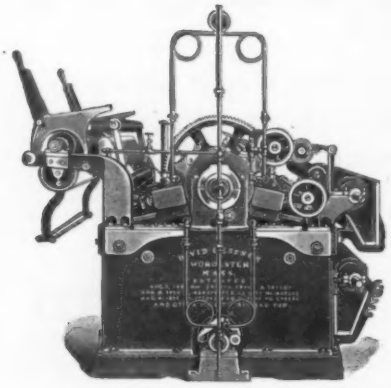
BOSTON NEW YORK PHILADELPHIA CHICAGO LONDON

348

David Gessner

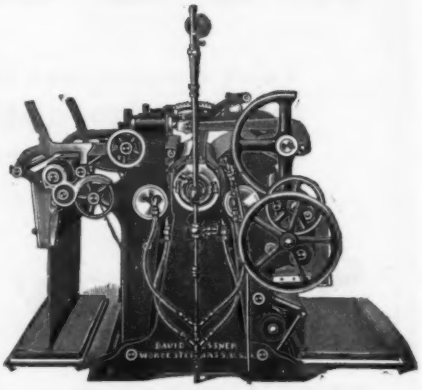
Worcester, Mass.





Latest Improved Cloth Finishing Machinery

Napping Machines and Presses a Specialty



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Fuel Economizers.
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Parson Mfg. Co.

Furnace for Boilers.
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Hunter, Jas., Machine Co.
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Lunkenheimer Co.
Pittsburgh Gage & Supply Co.
Walworth Manufacturing Co.

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New Process Raw Hide Co.

Gear Cutting Machine.
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Krout & Fite Mfg. Co.
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Scott & Williams.
Union Special Machine Co.
Wilcox & Gibbs Sewing Machine Co.

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Paxton & O'Neill.
Stafford & Holt.
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Mayo Knitting Machine & Needle Co.
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The New

Crompton-Thayer Loom Company

.. MANUFACTURERS OF ..

FANCY LOOMS

For Weaving Worsted and Woolen, Fancy Cottons and Silk Fabrics.

Dobbies, Box Motions and Supplies.

WORKS AND OFFICES:

677 Cambridge Street, Worcester, Mass.

Knitting Needles and Supplies - cont.
Ives, Loyal T.
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Kolb, Frank E.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
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Rheinhauer, D. & Co.
Treat, Orion.
Wardwell Needle Co.

Labeling Machines.
Beck, Chas., Paper Co., Ltd.

Leather.
Houghton, E. F., Co.

Loom Pickers.
Garland Mfg. Co.

Looms.
Asaia Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Draper Company.
Kilburn, Lincoln & Co.
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Lowell Machine Shop.
Mason Machine Works.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Hepworth, John W. & Co.
Leighton Machine Co.

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Borne, Scrymser Co.
Dixon, Jos., Crucible Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Lumpers.
Gerry, George & Son.
Schofield, Wm. Co.

Machinery Dealers.
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Taylor, James.

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Elliott & Hall.
Fabric Measuring & Packaging Co.

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Boston Blower Co.
Buffalo Forge Co.
Massachusetts Fan Co.
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Lorrimer, Wm. H., Sons Co.
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Whiteley, William, & Sons, Ltd.

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Easton-Burnham Co.
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Putnam & Co.
Rheinhauer, D. & Co.
Riley, C. E., & Co.
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Shaw, Victor, Ring Traveler Co.
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Tucker, W. W. & C. F.
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Whiteley, William, & Sons, Ltd.

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Burt Manufacturing Co.
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Stephenson Mfg. Co.

Oil Hole Covers.
Tucker, W. W. & C. F.

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Putnam & Co.

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Willcox & Gibbs Sewing Machine Co.

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American Mfg. Co.
American Pulley Co.
Cohoes Foundry & Machine Co.
Columbian Rope Co.
Evans, G. Frank.
Hunter, Jas., Machine Co.
Jeffrey Manufacturing Co.
Kilburn, Lincoln & Co.
Houghton, E. F., Co.
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Reeves Pulley Co.
Saginaw Manufacturing Co.
Schofield, Wm., Co.
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Howard & Bullough Am. Machine Co.
Kitson Machine Co.
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Smith, Jas., Woolen Machinery Co.

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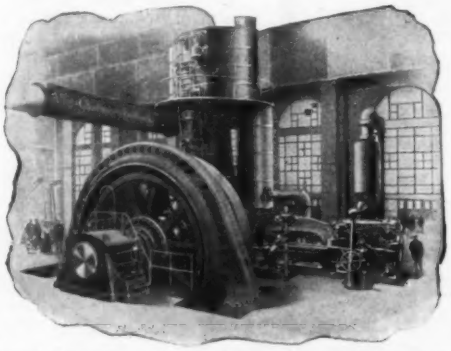

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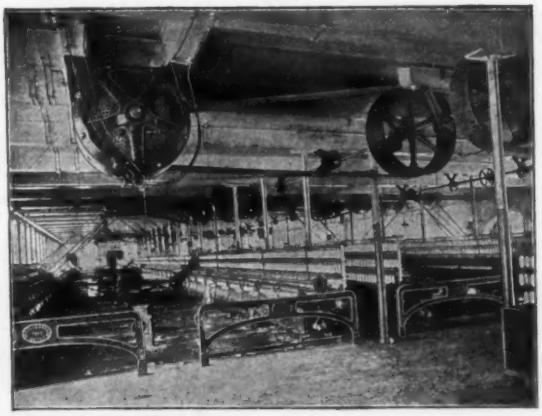

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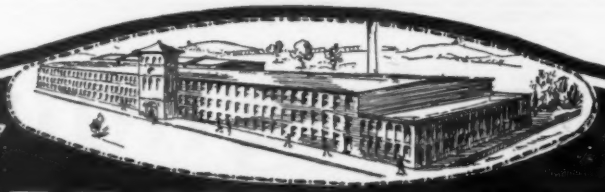

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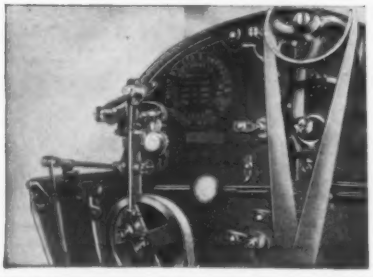

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Cotton Mill Superintendent, or assistant. Age 34; married. Worked on cotton machinery on coarse and medium numbers. Textile school education in designing, carding and spinning. 3003, Textile World Record.

Assistant Superintendent or boss weaver of cotton mill. Twenty-five years' experience. Unquestionable references as to character and ability. Thoroughly acquainted with plain, fancy box or lappet looms. Can take place on short notice. 3034, Textile World Record.

Superintendent of Cotton Yarn Mill or duck mill. A young man; American; married. Prefers position in the South. Worked in different departments, spinning, spooling, twisting, warping, reeling and bailing and now ready for a superintendent's place. Unquestionable references. 3087, Textile World Record.

Superintendency of cotton mill wanted by a thoroughly practical cotton manufacturer of over 20 years' experience. Age 38; married. Temperate. Good manager. Fully competent to obtain full production at minimum cost and maintain best selling qualities. Highest references given. 1236, Textile World Record.

Superintendent. All kinds of fancy cotton, white and colored, plain and fancy, jacquard and box work, also silks and worsteds. Would take good overseer of weaving position. 3120, Textile World Record.

Wanted. Position as superintendent of factory, manufacturing sweaters, cardigan jackets, ladies' golf jackets and all kinds of sporting goods, by an experienced workman on Noppen, Lamb or plain German machine (hand or power). Also complete finisher. Address Super. & Finisher, Textile World Record, Boston.

WOOLEN SUPERINTENDENTS.

Superintendent of small woolen mill. Piece dyed goods, thibets, Venetians, meltons, etc. 3114, Textile World Record.

Superintendent. Worked on cassimeres, unions, satinets, overcoatings, horse goods, bed blankets, linings, etc. Understands stock mixing, picking and figuring. Has had full charge of mill. 3074, Textile World Record.

Superintendent. Has made yarn and shoddies and about everything in woolen line. Good general knowledge of woolen manufacture. Familiar with English, Belgium and American carding, spinning and preparatory machinery. 3088, Textile World Record.

Superintendent or assistant superintendent wants position. Age 31; American; married. Good experience on all kinds of goods, especially on union and satinets. Good references. Six years' experience in present place, five as overseer and one as superintendent. 3139, Textile World Record.

Superintendent. American; married. Worked on cassimeres, dress goods, cotton warps, and has had some experience on worsteds. Will go anywhere, but would like a good Western mill. Good experience. 3034, Textile World Record.

Superintendent, manager or designer. Age 37; English; married. Worsted and woolen goods for men's wear and rain cloths. Worked in English mills, and has also been employed in this country. 3103, Textile World Record.

Superintendent, age 34; American; married. Worked on fancy woolens. Not employed, and can take position at once. Will not go to Canada or West or South. Would take a good boss spinner place or assistant superintendent, but wants over $4.00 per day. 3104, Textile World Record.

Superintendent or designer of small or medium sized mill. All kinds of fancy worsteds, cassimeres, cheviots, overcoatings and dress goods. Age 31; married; Scotch. 3076, Textile World Record.

Superintendent or boss weaver. 15 years' experience in worsted, woolen and silk goods. Graduate of Philadelphia Textile School. 32 years old; married. Good manager of help. American. 3119, Textile World Record.

Superintendent. Age 37; American; married. Woolen dress goods, fancy cassimeres, cloakings, etc. Will not go West, South or to Canada. First-class references. Graduate of Philadelphia Textile School, and also had good practical experience. 3126, Textile World Record.

Superintendent and designer, or assistant superintendent. Age 34; married. Worked on cloths ranging from all cotton to all wool and worsteds, such as cotton worsteds, jeans, army cloths, kerseys, etc. Excellent references. 3148, Textile World Record.

Superintendent and Designer. Age 30; American; married. Cotton warp, worsted and silk vestings, tapestry curtains, plaid backs, broadcloth, etc. 3146, Textile World Record.

COTTON CARDERS.

Overseer of Carding Room. Age 50; Scotch; married. Good experience, and excels on fine combed work. Wants N. E. States, or Southern. 3144, Textile World Record.

Carder in Cotton Mill. Coarse or fine, white or colored, hosiery, Egyptian, etc. Age 35; Canadian; married. 3029, Textile World Record.

Overseer of Carding. Large experience on all kinds of work and both English and American systems. Can furnish first-class references. Had charge of carding in some of the best New England mills. 3009, Textile World Record.

Overseer of Carding or cotton ring spinning. Worked on carded and combed Peelers, Egyptian, and Sea Island cottons, making yarns from 8 to 80. 3015, Textile World Record.

Overseer of Carding. Has held all positions in picker and card rooms. White and colored goods, 6s to 40s. 3070, Textile World Record.

Overseer of Carding Mill. All kinds of fine yarns. Started up two of the largest card rooms in New England. Considered an expert in the manufacture of combed yarns from the bale to the finished article. First-class recommendations. 1745, Textile World Rcord.

Overseer of Cotton Carding. Worked on all classes of cotton, carded and combed, in counts to 135s. Will not go West or South. 3061, Textile World Record.

Overseer of Carding or Ring Spinning. Age 35; American. Sheetings, prin s and yarns, coarse and fine. Worked on most American machinery, but is more familiar with Lowell & Whitin. 1915, Textile World Record.

Overseer of Carding or Superintendent. Wide experience in large mills. Age 42; married. Finest of references. Will take large carding or superintendency. Familiar with all counts. 3133, Textile World Record.

Overseer or secondhand in preparatory department of long chain beaming, quilling, tape dressing, warping and spooling. A Scotchman; married. Will not go West or South. 3156, Textile World Record.

WOOLEN CARDERS.

Overseer for Washing, Carding or Combing wool for worsted wants to better himself. Speaks German, French and English. Best of references. 2033, Textile World Record.

Carder, or carder and spinner. German; married. Worked on all wool, wool and cotton, and shoddy mixes. Ten years' actual experience, and can furnish first-class recommendations. 2057, Textile World Record.

Overseer of Woolen Carding. Worked on all wool, wool and shoddy, wool, shoddy and noils. Wants $4 a day. Familiar with Davis & Furber, Furbush, Lombard and Bollette and Brown Patent. 3071, Textile World Record.

Overseer of Combing, washing, carding. Age 36, English, married. All classes of wool. Good experience and first-class recommendation. 3094, Textile World Record.

Overseer of Woolen Carding. Would accept secondhand position. All wool, cotton and wool, shoddies, mixes, worsteds. Does not wish for position on shoddy, but would consider one. Blankets, suitings, flannels. Understands spinning. 3093. Textile World Record.

Carder and Spinner. Been overseer 32 years, making every variety of cassimere, flannels, overcoatings, cloakings, dress goods, etc. Married; American. 3132, Textile World Record.

COTTON SPINNERS.

Overseer of Mule Spinning who has had a wide experience in large New England mills on yarns ranging from 24's to 160's is open to a position. 37 years old; American. Good references. 2003, Textile World Record.

Overseer Ring Spinning, or asst. superintendent. Sea Island combed from 6s to 30s, American from 6s to 50s; in fact, all grades of cotton, also expert on cable yarn. Prefers South, but will go anywhere. Wants $3.50 per day to begin with. 2020, Textile World Record.

Overseer of ring spinning, spooling, warping and dressing. Will not go South. Middle aged; American; married. Good experience and references. 3059, Textile World Record.

Boss Ring or Mule Spinner. Age 43; English; married. Asa Lee mules, Lowell Machine Shop, Platt, Mason mules; Howard & Bullough, Lowell and Mason frames. Yarns from 5's to 90's. 3001, Textile World Record.

Overseer of Cotton Mule Spinning. Understands Mason and English makes of mules. Has worked in mule room sixteen years, five years as second hand and a year and a half as overseer. 28 years old; married; steady and temperate. Would like to get work in N. E. or New York states. Has worked on colored hosiery yarn and filling. 1822, Textile World Record.

Overseer of Ring Spinning. Aged 42; American; married. Ginghams, sheetings, awnings, denims, etc.; $3 to $4 per day. 3018, Textile World Record.

Overseer Ring Spinning, spooling and warping wishes a position. A married man, with good experience. Worked on sheetings, shirtings, jeans, grain bags. 3152, Textile World Record.

Supt. of Cotton Mill, or overseer of mule or ring spinning is open to a position; 16 years' experience in Northern mills, on yarns, denims, awnings, apron checks, bicycle suitings, shirtings, etc., etc. Familiar with all well-known makes of cotton machinery; 29 years old; American; married. Can give references from large Massachusetts mills. 1527, Textile World Record.

Overseer of Cone Winding and spooling or ring spinning, who understands Universal, Foster, Broadbent and Payne winders, and Whitin and Mason frames, desires a position. Has worked on carded and combed yarns from 4's to 160's; also, mercerized, gassed and bleached yarns from 2 to 8 ply. Young man; American; married, and can give satisfactory references from large mills. 1960, Textile World Record.

Overseer of Spooling, warping, beaming, slashing and web drawing. Age 37; married. 3010, Textile World Record.

Overseer of Spinning. Age 34; married. Good experience. 20s to 90s Egyptian and American cotton. 3125, Textile World Record.

WOOLEN SPINNERS.

Roll Coverer wants an opening for work. Can cover cotton or worsted rolls, make aprons, or better, has had large experience. Can furnish tools. Work by piece or day. 1803, Textile World Record.

Superintendent woolen mill. Age 47; English; married. Wants New England or Middle States. 10 years' experience in first-class N. E. mills. 2028, Textile World Record.

Overseer of Warping, Spooling and Winding. Dress goods and cloth. Will not go to Canada. Aged 40; married. Good experience. References. 3027, Textile World Record.

Woolen Finisher. First-class. Familiar with all classes of goods and machinery. Can take full charge from loom to case. Has always been very successful. 1244, Textile World Record.

COTTON WEAVERS.

Overseer of Weaving or designer. Lawns, sheetings, twills, sateens, quilts, bedford cords, lappets. A young man; unmarried. Good experience and first-class recomendation. 3063, Textile World Record.

Overseer of Weaving. Englishman; 33 years of age; married. Worked on fine lawns, sheetings, sateens and fancies, coarse drills, twills, bicycle cloth, automobile cloth for tires. Familiar with Whitin, Crompton, Knowles, Mason, Kilburn & Lincoln and Lowell machines. 3073, Textile World Record.

Overseer Cotton Weaving. Plain and a variety of fancies, lenos, etc. Good experience. A young man; English; married. 3147, Textile World Record.

Overseer of plain cotton weaving. Age 27; American; married. Familiar with Whitin, Mason, Colvin and Draper looms. Worked on prints, sheetings, cambrics, lawns, twills, etc. 3143, Textile World Record.

Overseer of Weaving. Sheetings, sateens, ginghams, and dimities. Will not go South. 3116, Textile World Record.

Overseer of Weaving. Worked on sheetings, twills, sateens and fancies. Wants not less than $18 per week. 3157, Textile World Record.

Practical Boss Weaver and loom fixer wants position. Good and long experience. Good record for big production; good quality and for being a good manager of help, and the getting and keeping plenty of good hands. A sober and steady man. Will go anywhere. Either cotton, woolen or jute. 1806, Textile World Record.

WOOLEN WEAVERS.

Overseer of Weaving, also designer. Men's wear, woolen and worsted, and fancies of all kinds, cotton worsteds, dress goods. Knowles and Crompton looms. Age 35. 3056, Textile World Record.

Overseer of Weaving, or would take good second hand job. Age 42; married. Worked on dress goods, suitings, plaid backs, cloakings, meltons and other classes of goods. Worked on Crompton & Knowles loom. 3016, Textile World Record.

Boss Weaver or assistant superintendent. Worked on all kinds of worsteds and woolens. Crompton & Knowles looms. Wants place at once. Middle aged; English; married. Good experience. Excellent references. 3062, Textile World Record.

Boss Weaver. Aged 28; married. Cassimeres, beavers, kerseys, dress goods, flannels, blankets. Worked on Crompton & Knowles broad looms. Good recommendation. 3066, Textile World Record.

Overseer of Woolen Weaving, or would take a secondhand job. 35 years old; married. Familiar with Crompton & Knowles looms. Good references. 3089, Textile World Record.

Overseer of Weaving or designer. Age 29; American; married. Thibets, meltons, kerseys, worsteds and cotton worsteds. Crompton & Knowles looms. Good experience. First class recommendation. 2051, Textile World Record.

Superintendent of Weaving. Englishman; married. Worked on fancy worsted and cotton dress goods and men's wear. First-class recommendations. 3111, Textile World Record.

Boss Weaver wants position. Very wide experience. White and colored, plain and fancy. Understands all kinds of looms. 335, Textile World Record.

Overseer of Weaving. Worked on all kinds of fancy dress goods, cotton, worsted and woolen, also men's wear. Age 31; English; unmarried. 3159, Textile World Record.

DYERS.

Dyer, bleacher and washer. Age 30; American; married. Cotton print goods in either the roll or garment, long and short hose, raw stock and yarn, aniline or oxidized black on hosiery. Good references. 3081, Textile World Record.

Boss Dyer. Scotch; married. Good references. Bleaching, scouring, dyeing and carbonizing in roll or the garment. Raw stock, cotton or wool. Has worked on ginghams, elderdowns, knit goods. Will not go South or to Canada. 3149, Textile World Record.

Dyer or superintendent of dyeing and finishing. Age 34; English; married. Not less than $3.50 per day. All classes of woolen, worsted, mixed and cotton piece goods, bleaching, mercerizing. Can take charge from loom to case. 3121, Textile World Record.

Boss Dyer. A young man; married; American. Worked on wool, shoddy, cotton, silk noils, rags, camel's hair and piece dyes on satinets. Will accept $2 per day to start. 3122, Textile World Record.

Boss Dyer, mercerizer or bleacher. Scotch, married. Wool, yarns, piece, cotton and slubbing. Can take place at once. First-class recommendations. Familiar with all the latest improved machinery in the dyeing business. 3097, Textile World Record.

Boss Dyer. Twenty-six years' experience in all in woolen mills, 22 years being an overseer. Middle aged; American; married. Will not go South or to Canada. 3134, Textile World Record.

Dyer. Scotch; married. Cotton and wool skein and hosiery. Mercerizing and bleaching. Excellent references. 3141, Textile World Record.

Wanted, position as boss dyer and bleacher of cotton yarns, long and short chain and skein yarn. Good references. 3145, Textile World Record.

Superintendent of cotton bleachery is open to a position. Excellent experience. American; married; aged 37. Familiar with cambrics, sheetings, shirtings, lawns, sateens, drilling and fancy weaves. 3153, Textile World Record.

Fancy Dyer. Aged 37; American; married. Cotton, wool and silk. 3158, Textile World Record.

FINISHERS.

Finisher and assistant superintendent wants position. Age 31; American; married. Good experience on all kinds of goods, especially on unions and satinets. Good references. Will not go West, South or to Canada. 3139, Textile World Record.

Boss Finisher. 25 years' experience on all classes of goods, woolen and worsted and cotton mixtures of all grades. 3142, Textile World Record.

Boss Finisher. American. Cheviots, cassimeres, beavers, dress goods, etc. Wants $2.50 to $3 per day. 3123, Textile World Record.

Woolen Finisher. Age 35; American; married; Wants $2.50 or $3.00 per day. Good experience. 3138, Textile World Record.

Overseer of Cloth Room. Age 37; American; married. Wants $18 per week or over. 3110, Textile World Record.

Overseer of Finishing. Age 33; American; married. Meltons, coverts, cheviots, flannels, mohairs, etc. Wants position in New England, preferably Rhode Island. 3129, Textile World Record, Boston.

Boss Finisher in a woolen mill. Worked on kerseys, meltons, cassimeres, satinets, cheviots, etc. Wants $3.50 per day. Will not go to Canada or West. 3077, Textile World Record.

Foreman of cotton finishing room. Eight years' practical experience on napping machines, starching and calendering. Worked in mills in Italy and America. Married. 3155, Textile World Record.

KNITTERS.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania. 3037, Textile World Record.

Boss knitter, sewing machine fixer. Age 28; American. All classes of ladies' and children's knit underwear made on circular latch needle machines. Wants place at once. 3102, Textile World Record.

General Manager or superintendent of ribbed underwear mill. American; married. Been in underwear business eleven years as superintendent and manager. First-class references as to character and ability. 3100, Textile World Record.

Latch Needle Knitter on N. & T., S. & H., S. & W., McM. & W., Pepper, Lewis Jones, etc., circular machines. Twelve years' experience as boss knitter and superintendent. Wants steady work. Sober, good manager of help, best of references. 3106, Textile World Record.

Boss Knitter or fixer. Would like to work with boss finisher on sewing machines. American; age 32. Familiar with McMichael & Wildman, Nye & Tredick, Snyder & Fisher, Scott & Williams and other makes of latch needle machines, Tompkins spring needle machines, and understands winding. 3118, Textile World Record.

Overseer Boarding and finishing hosiery. All kinds of men's, women's and children's hosiery, except silk. Age 41; American; married. Can furnish references. 3035, Textile World Record.

Superintendent of knitting mill, or foreman in large plant, is open to position. Had some 15 years' experience as machinist, foreman and superintendent. Familiar with all grades seamless hosiery and most makes of seamless hosiery machinery. Understands business from starting new mills to finish. Perfectly sober and reliable. 3078, Textile World Record.

Position wanted in charge of boarding, pressing, pairing, folding of hosiery, etc. First-class references. 3105, Textile World Record.

Superintendent knitting mill. Cotton and wool hosiery, heavy mittens, sweaters, toques. Good experience. Aged 45; married. 1291, Textile World Record.

Knitting Fixer. A young man; American. Ribbed and seamless hosiery, cotton, lisle and Egyptian yarns. Familiar with McMichael & Wildman ribbers, Paxton & O'Neill and Branson 3/4 automatic and Hepworth loopers. Will not go South. 3130, Textile World Record.

Boss Knitter or Sewing Machine Fixer. German; married. Familiar with all makes of knitting and finishing machines on ladies' underwear. Will not go South or to Canada. 3128, Textile World Record.

DESIGNERS.

Designer or superintendent. Age 37; English; married. Experienced in this country and England. Worked on cloakings, suitings, coverts, broadcloths, etc. Wants $30 to $40 per week. Mill closed, and wants place at once. Good references. 3140, Textile World Record.

Designer. A young man who has had eight years of practical experience in cotton designing wants position as designer or boss weaver. Worked on Marseilles, crochet and satin bed spreads, table covers, ginghams of all kinds including leno, lappet and all classes of the above. Jacquard work a specialty. 3107, Textile World Record.

Assistant Designer or assistant superintendent. Young man; American. Men's wear, ladies' dress goods, shirtings, silk brocades, etc. Graduate of Philadelphia Textile School, and also has had short experience in mill. 3160, Textile World Record.

Designer or assistant. Worked on woolen and worsteds, cotton worsteds and mercerized goods. Good experience. A young man, single, Swede. 3127, Textile World Record.

Boss Knitting Machine Works,

READING, PENN.

BUILDERS OF THE

NEW IMPROVED 15/16 Automatic Hosiery Knitting Machine.

WATCH THIS SPACE!

Illustrated description will appear next month.

MISCELLANEOUS.

Asst. Superintendent of dyeing, printing and finishing plant. Experienced in cotton and silk and capable of turning out finished product. American; 27 and married. Best of references. 3136, Textile World Record.

Second Boss or in advisory capacity for jacquard weaving. Familiar with almost every line of silk fabrics, also cotton backs, tapestry and upholstery goods, hammocks, table and bed covers, ribbons, etc. 3135, Textile World Record.

Loom Boss or asst. superintendent. All kinds of worsted goods for ladies' and gentlemen's wear and various classes of cotton goods. Worked in English mills and also in this country. 3151, Textile World Record.

Loom Boss. Age 32; American; married. Also a designer. Knowles, Crompton, Jacquard and dobby looms. Wants $3 per day. 3150, Textile World Record.

Machinist. French; married. Has had full charge of all kinds of repairing. Understands all about boilers, engines, motors and can give best of references. 3090, Textile World Record.

Traveling position with mill supply house. Has been dyer, but mill now closed. 3108, Textile World Record.

Overseer or second hand's position. Understands twisting, warping, spooling and cone winding. Worked on all kinds of cotton yarns. Will not go West or South. 3112, Textile World Record.

Master Mechanic in cotton mill. Wants $1,500 to $2,500 per year, according to duties and position. Can take place at once. Will not go to Western States or Canada. Familiar with steam engines, pumps, boilers, water wheels and complete cotton mill equipment. 3039, Textile World Record.

Textile Manufacturers all over New England are Investigating the Merits of the

CARBON STEAM COAL

Its quality is the very best and guaranteed as good as any Coal coming into New England

Prices Right. Quality Right.

Shipments Prompt.

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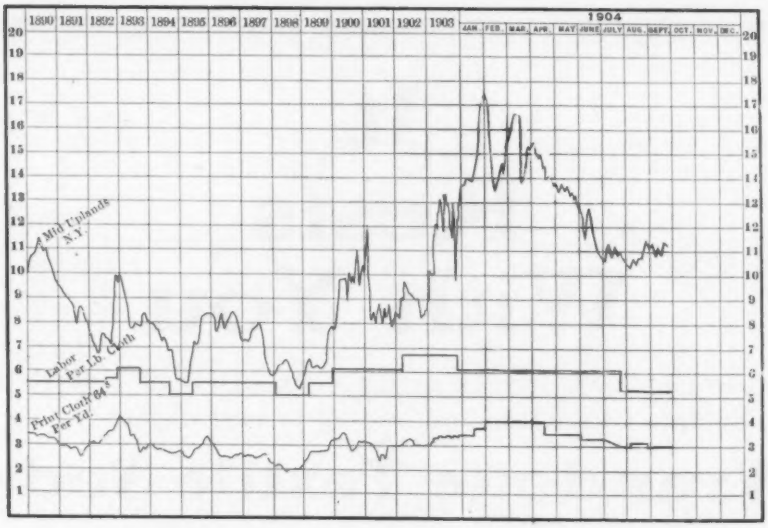
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CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

Cotton has fluctuated on both sides of 11 cents for Middling Uplands since our last report and at present writing is practically unchanged. The receipts of new cotton have been heavier than for any year since 1902, the figures being as follows:

Movement into sight since Sept. 1, in previous years.

1904.....	820,767	1901.....	595,023
1903.....	523,015	1900.....	831,575
1902.....1,635,784		1899.....1,054,563	

The strengthening of the market in face of these heavy receipts has been due to the readiness with which cotton has been absorbed by the mills at home and abroad. It is well known that the cotton storehouses throughout the world are practically empty and that a large part of the machinery is idle owing to the inability to get raw material. This condition has existed for nearly two years. The market, consequently, possesses an absorbing power that has not been equalled since the end of the cotton famine during the civil war. This is a condition that must be reckoned with. Furthermore, the Southern planters are financially in excellent shape to hold their cotton for higher prices, a policy that they are apparently disposed to adopt.

The growing crop, while at this writing in a satisfactory condition, is not yet beyond the danger of possible damage by early frosts. The Chronicle reports the world's visible supply on Sept. 23, 1904, at 1,428,357 bales as compared with 1,157,462 bales in 1903, 1,761,737 bals in 1902, and 1,451,825 bals in 1901.

Practically all the increase of this visible supply over last year consists of American cotton, there being but 21,000 more bales of East Indian cotton this year than there was last year.

South Carolina, North Augusta. A cotton mill is projected at this place by business men of Augusta, Ga.

Texas, Marble Falls. A proposition is under way to utilize the old woolen mills here for manufacturing cotton goods.

C. M. BLAISDELL, Pres. and Treas. G. A. BLAISDELL, Vice Pres. and Sec'y.
Established 1860—Incorporated 1893.
THE S. BLAISDELL, JR., CO.,
COTTON, EGYPTIAN PERUVIAN
American Long Staple a Specialty. Shipments direct to mill from Egypt, Peru and all American Southern Points.
CHICOPEE, MASS.
Cotton Waste Purchased on Yearly Contract from Mills.

WEIMAR BROS. MANUFACTURERS OF Cotton Mercerized Tapes,
SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.
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It Rests With You

Good business judgment suggests a trial of new things, to be open to conviction and willing to investigate.

Wyandotte Textile Soda

is a new material, but not an accident. It is the result of a definite purpose worked out in harmony with scientific principles. It solves *the* problem of freeing the wool fibre from the many substances that adhere to it, without in the least injuring any of its natural properties.

It is endorsed by the highest authority on wool scouring, those not controlled by prejudice but whose convictions are the result of reason.

We state these facts here believing every reader of them to be open to conviction. The scouring material you now use you tried first as an experiment—then experiment with Wyandotte Textile Soda. Those who have, find it to be all we claim, and more.

Don't argue, don't hesitate, just act.

None genuine except with a card bearing this Trade Mark

in every package.

The J. B. FORD CO.

Sole Mfrs.

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You will be welcome at our Exhibit, Block 56, Aisle B, Agricultural Building, World's Fair, St. Louis.

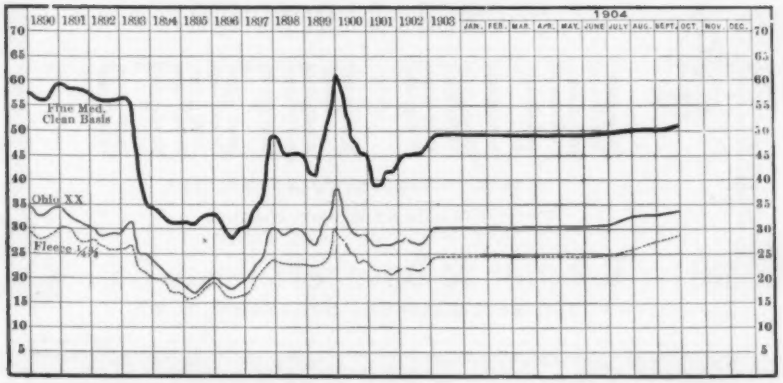

CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

Wool Market.

Wool has been active and higher since our last report. Manufacturers have purchased freely and under the stimulus of the strong statistical position of the staple prices have advanced in nearly all grades. This rise has created a fear in some quarters that an era of speculation in wool is about to be inaugurated. A glance at our chart shows the record of the last occurrence of this kind in which fine medium was pushed to the dizzy height of 62 cents. This was four years ago, but men's memories are short and the unhappy results of that boom may now be forgotten to such an extent as to result in a repetition of the experience. A word of warning may, therefore, not be amiss at this time. The lesson taught then and which would probably be taught now if the price of wool is to be 10 or 15 per cent. above the present level, was that higher prices do not mean cash profits, and that extreme values such as prevailed at the beginning of 1900, work their own destruction by depressing the market and forcing manufacturers to substitute cheaper material in the manufacture of goods.

The demand for wool during the past month has come from both large and small manufacturers. A further element of strength has been secured by the improvement in the goods market and the advance in some lines.

The wool market abroad has one significant feature, that is, the reduced offerings at the opening of the recent London auction, 81,000 bales being offered as compared with 140,000 last year. There is no indication of any weakening of the foreign wool market and this will further tend to support the market in the United States, where more than one-half of the scoured weight of the wool consumed comes from abroad.

Wool and Woolen Goods Made **NONSHRINKABLE** by the use of "Nevershrink Process."
May be applied at any stage of manufacturing. Write for Booklet.
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STANDARD QUALITY COMBED RAMIE TOPS and NOILS a Specialty. RAMIE YARNS in All Numbers for All Purposes

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WOOL, TOPS, NOILS, YARNS,

Wool, Mohair, Camel Hair, Silk, and Ramie Tops and Noils. Woolen, Worsted, Mohair, Ramie, and Silk Knitting Yarns. All kinds of Yarn for Weaving Purposes.

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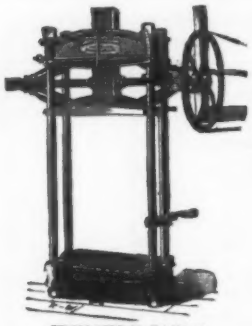

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USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS
TO SPOOL FROM COP, SKEIN, OR BOBBIN.

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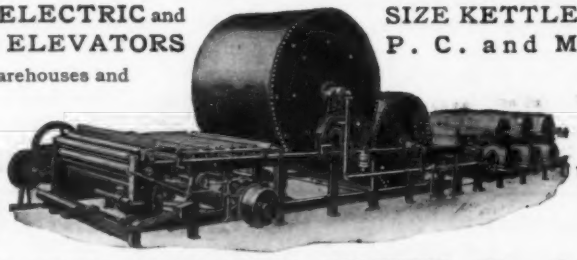

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The COHOES IRON FOUNDRY & MACHINE CO. Cohoes, N. Y.

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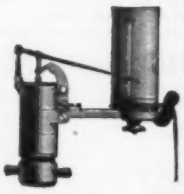
In the Hands of a Competent Man Will Increase the Efficieney of Your Plant and Cut Down Your Coal Bill. Faultless in Design. Perfect in Workmanship.



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CROSBY STEAM GAGE AND VALVE CO.

Stores:
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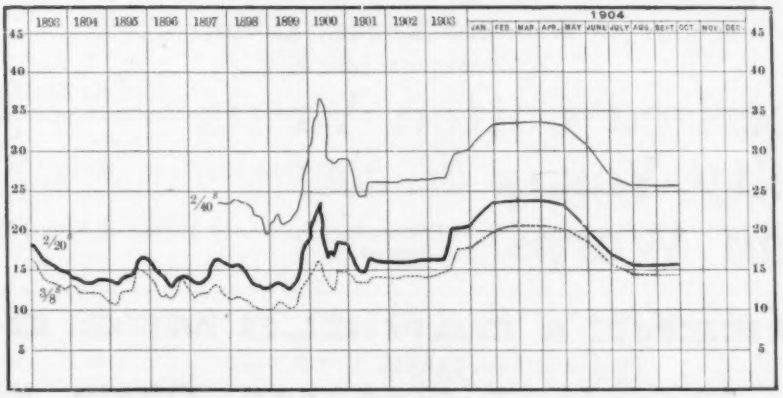
Office and Works:
BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

The Cotton Yarn Market.

Cotton yarns have been in better demand and prices have been stronger owing to the continued firmness of raw cotton and to the policy of restricting production to actual orders which is now and has been for some time followed by the spinners. The trade has gradually adapted itself to a raw cotton level of 10 to 12 cents, and manufacturers are applying themselves industriously to the solution of the problem of how to produce a substitute for their former fabrics without raising the price of the manufactured goods. This is educating the weavers and knitters in the art of manipulating materials, some of which can not be classed as textiles.

During the last six weeks yarn prices have shown a loss to the spinners, who are now more firmly convinced than ever that the path of safety lies in high prices and an exclusive order business. Mercerized yarns are in good demand. As a general thing the cotton yarn market is in a more satisfactory condition than at our last report. We quote as follows:

Eastern Cops.

6's	16¾
8's	17
10's	17¼
14's	18¼
16's	18¾
18's	19¼
20's	19¾
22's	20¼
24's	20¾
26's	21¼
30's	22¼
34's	22¾
36's	23
40's	23½

On cones, ¾c. more up to 14's; 1c. more from 15's to 22's; 1½c. from 23's to 35's, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12's	20
14's	21
18's	22
20's	23
24's	24
26's	24½
30's	25
36's	26
40's	27
45's	30
50's	34
55's	37
60's	40

Eastern Two-Ply Warps, Carded Peeler.

2/30's	26
2/36's	27
2/40's	28
2/45's	31
2/50's	35
2/60's	41

Egyptian Weaving Yarns. Single Skeins Combed.

30's	33
35's	34
40's	35
45's	36
50's	40
55's	46
60's	48
70's	52

Two and Three Ply Skeins, Combed.

30's	35
36's	37
40's	38
45's	40
50's	43
55's	47
60's	52
70's	58

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade.

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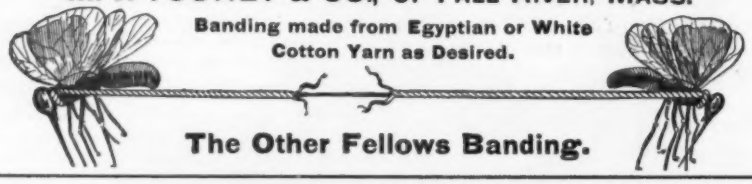
M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.



The Other Fellows Banding.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS.

4s to 60s.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

Philadelphia Yarn Market.

As the new season advances the prospects for low priced cotton and cheap yarn become less and less favorable. Spinners on all grades of yarn are standing for 1c. to 2c. per pound advance, and while the demand for yarn is still dull there has been such a general curtailment of production that stocks of yarn have been greatly reduced during the past month.

This condition would of course be speedily relieved if mills should resume operations, but spinners that are shut down are not anxious to start even on a basis of the present advanced prices. While cotton has been coming in rather freely, there has been a ready market for it and prices have been well maintained. It looks as if farmers had made up their mind to get at least 10c. for their product this year and they prefer to hold it rather than sell below this price. There has been some slight improvement in the trade the past few weeks, possibly more noticeable in the knitting trade than the weaving. Prices today are firm at the following basis:

Southern frame spun cones:—

7's and Coarser	18
8's and 9's	18
10's	18½
12's	19
14's	19½
16's	20
18's	20½
20's	21
22's	21½
24's	22
26's	22½
30's	23
40's	25
50's	32

Southern high grade mule yarn:—

Cones.

10's	19½
12's	20
14's	20½
16's	21
18's	21½
20's and 22's	22-22½
24's	23

Southern frame yarn, lower grades:—

6's and 8's	17
10's	17½-18

Eastern cones (high grade quality):—

10's	19½
12's	20
14's	20½
16's	21
18's	21½
20's and 22's	22-22½

Skein yarn (mostly Southern):—

4's to 8's soft	16½
10's to 12's	17-17½
14's to 20's	17½-18½
22's	18½-19
14/2	17½
16/2	18
20/2	19

PAULSON, LINKROUM & CO.
Successors to BUCKINGHAM, PAULSON & CO.
Commission Merchants
COTTON YARNS of all Descriptions
83 Leonard St., NEW YORK
302 Chestnut St., Phila. 210 Munroe St., Chicago, Ill.
Cash Advances, Cash Sales and Prompt Returns. Consignments and correspondence solicited.

JAMES E. MITCHELL CO., COMMISSION MERCHANTS.
Cotton Yarns
FOR ALL PURPOSES.
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COTTON AND WORSTED YARNS.
BOSTON. NEW YORK. PHILA.
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With FRED'K VIETOR & ACHELIS,
YARNS.
66-72 LEONARD STREET, - NEW YORK.

Fred Sternberg & Co.
530 Broadway, - NEW YORK.
MERCERIZED TURKEY RED GASSED } COTTON YARNS.

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COTTON YARNS } ALL NUMBERS
MERCERIZED YARNS } FOR ALL PURPOSES
346 BROADWAY, NEW YORK.

MOELLER & LITTAUER,
SILK, WORSTED, WOOLEN YARNS COTTON AND MOHAIR
Polished Threads and Tinsel. Artificial or Wood Silk.
Mercerized, Turkey-Red, Fine Gassed Yarns.
109 GREENE ST., NEW YORK

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG, MASS.

COMBED **COTTON YARNS** CARDED

In Chains and Skeins, on Balls, Beams, Spools—Single or Twisted.

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FANCY YARNS and POLISHED THREADS.

Offices: 229 Chestnut St., Philadelphia.

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Spool Tapes a Specialty.

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IN ALL COLORS

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Consignments Solicited from Southern Mills. Liberal Advances made and Sales Cashed Promptly.

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Cotton Warps and Yarns. In Gray and all Colors, Single or two or more Ply, and Cable Cord.

Novelty Yarns. in Various Patterns, Colors and Twists.

Carded and Colored Cotton. For Mixing with wool. Machined or in Roving.

E. MORGAN, PRES. H. K. WIGHT, TREAS. W. C. GODFREY, AGT.

Indian Orchard, Mass.

30/2	21
40/2	25
16/3 slack	17½
12/3 slack	17½
8/3 carpet	16
8/3 slack	16
9/4 slack	16

Warps (mostly Southern):—

10's to 12's	16½
14's	17
16's	17½
20's to 22's	17½-18
26's	19
14/2	17½
16/2	18
20/2	19
24/2	20
30/2	22
40/2	26

Mixed colored yarns (mock twist, half colors):—

6's to 10's	18½-19
12's to 14's	20-20½
16's to 18's	21-22

Silver and jaeger, 1½c. over white.
Mock Egyptian, 2c. advance over white.
Egyptian, 4c. to 5c. above best quality white.

Worsted Yarn.

Spinners are getting short of orders; the advance was too radical and weavers were unable to follow the market. The demand for yarn started in June. Prices had been established and spinners were glad to fill orders at the prices then prevailing. The orders placed were in some instances very large but purely speculative. The conservative weavers placed orders for actual requirements and did not cover for more than their initial orders, believing that the yarn prices would be evenly maintained. These orders ranged from 5,000 to 15,000 pounds and were largely for 1/4 blood yarn. As the season progressed spinners advanced prices sharply and in some instances refused to quote prices. Orders immediately began to fall off and yarn salesmen were sent after more orders, although the spinners for the time being were very busy. No orders were secured because many of the weavers withdrew their samples as there seemed no stopping to the advance in 1/4 and 3/8 Blood yarn.

One very large weaver told the writer that he had a very nice line of worsted requiring 1/4 Blood yarn and should have been able to use at least 50,000 to 100,000 pounds of yarn in this particular line. Orders began to come in and on account of the advancing market he was obliged to advance the price of his cloth. He had covered on yarn for part of the anticipated business and although buyers were willing to pay his original prices, they would not pay the advance. The result has been he has not sold one piece of cloth from this particular line and he still has his yarn on hand and is actually trying to sell this yarn because he can get no orders for the cloth which promised so well in the beginning. There are many other weavers in the same position.

The spinners are not to be blamed for these sharp advances. The trouble has been the cost of

TRY OUR
Silkine, also Lisle Silk
FINISH
—FOh—
Hosiery, Knit Goods, Yarn, Fast Black, Harsh Colors, and Fibres.
O. K. SOAP CO., 968 Franklin St., PHILA.

LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns, For Weaving Purposes.
Linen Jacquard Harness Twines, Fine Cotton Harness and Heddle Twines, For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

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COTTON YARNS
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Ballou Yarn Co.
PROVIDENCE, R. I.
Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.
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PERCY H. de MAURIAC, Vice President.
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Thomas Wolstenho'me
MANFRS. OF Sons & Co.,
ALL NUMBERS
SINGLE AND TWO-PLY,
On Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural and Fancy Mixes.

Worsted
YARNS
Sell Direct,
Office and Mills, Frankford Ave. and Westmoreland St., Phila, Pa.

POCASSET WORSTED COMPANY,

Worsted Yarns.

OFFICES:
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PROVIDENCE, R. I.

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Worsted and Mohair Yarns—White or colors, in skeins, on spools, cones, or shuttle bobbins.

Novelty Yarns—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making yarns only.

Genapped Yarns of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

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French System. B. F. BOYER CO., Bradford System.

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EDDY & STREET,
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SELLING AGENT FOR

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Loridan Worsted Co.,

17 Bank St., PHILADELPHIA, PA.

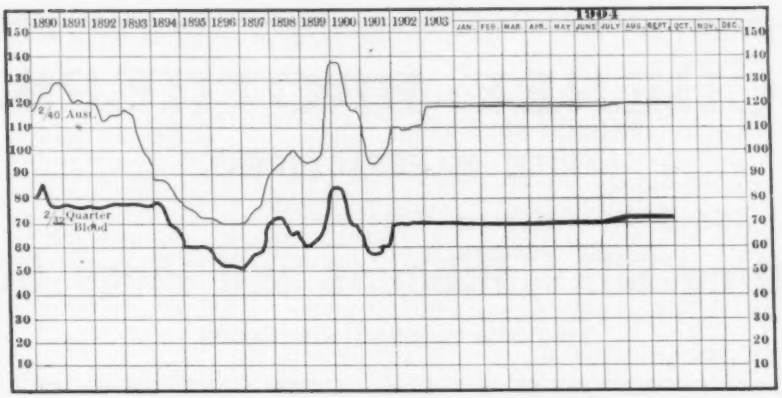


CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

the raw material, and the result of it all is that weavers are going from 1/4 Blood yarn in heavy sizes to 1/2 Blood yarns in 2/38's and 2/40's and single yarns in 1/12's, 1/18's and 1/24's. There really is no cause for wonder that manufacturers are being driven off this 1/4 Blood and 3/8 Blood yarn. A certain weaver wanted a price for some 1/4 Blood yarn and this is the letter the spinner wrote in reply:

"At present we cannot quote a price to your party. We have none of this quarter blood stock on hand and the problem is where can it be obtained. When your party is ready to purchase we will endeavor to find the stock, and quote him a price on the market. He must be aware that the price on this quality has advanced 10 cents per pound since he placed his last order."

Spinners have been obliged to work very cautiously in accepting orders as the wool market has been so uncertain. We hear of one large spinner who accepted orders without covering on stock and who will be obliged to work for six months at cost in consequence. The trend of the market is decidedly toward a finer yarn and some good orders have been secured for yarn in the finer grades.

It is an undoubted fact that the larger spinners and the larger mills have stocked up heavily with worsted wools out of which to make yarn. When the heavy weight season opens the prices at which the larger mills will offer cloth will make it impossible for the smaller mills, which have laid in no supplies, to compete on the market because of the prices they will be obliged to pay for yarn and material.

The French spinners have secured some good orders for future deliveries. These spinners secured orders for a quantity of yarn before the advance had taken place and are now refusing to take orders in large blocks as they believe prices will be much higher later. Hence, while they do not ask

SILK NOILS AND SILK NOIL YARNS
In White and Colors.
A. T. SKERRY & CO., 47 Leonard Street, NEW YORK.

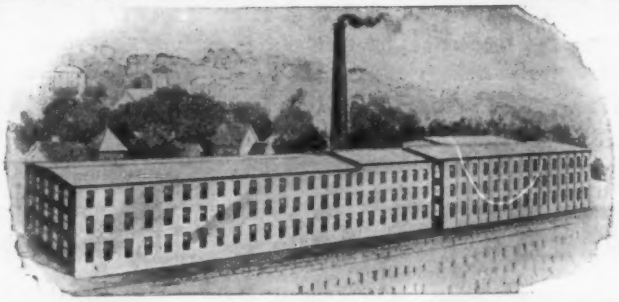
MOHAIR LOOPS, KNOTS AND FANCY YARNS FOR DRESS GOODS & CLOAKINGS.

QUEENSBURY MILLS WORCESTER MASS.

MOHAIR TOPS AND YARNS FOR WEAVING

LUSTRE YARNS FOR SERGE LININGS

ALPACA YARNS



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DRESS GOODS YARNS
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WORSTED YARNS

MOHAIR

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SILK MANUFACTURERS,

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Knitting Silks, Ribbons and Piece Goods

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, IN THE HANK, OR ON CONES, FOR MANUFACTURERS' USE. SILK FOR SPECIAL PURPOSES MADE TO ORDER.

Mills: SOUTH MANCHESTER and HARTFORD, CONN.

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929 Chestnut Street, PHILADELPHIA.
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239 Fifth Avenue, CHICAGO.

WILLIAM RYLE & CO.,

Foreign and Domestic

Spun Silk Yarns and Noils.

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., NEW YORK.

SAUQUOIT SILK MFG. CO.,

Insulating and Braiding Silks.

ORGANZINE, TRAM and HOSIERY SILKS

Fast Dye Organzines for Woolen Manufacturers a Specialty.

Mills: Bethlehem, Pa., Philadelphia, Pa., Scranton, Pa. New York Representatives, Wm. Ryle & Co., 54 Howard St.—Phila. Office, 4015 Clarissa St. (18th St. and Hunting Park Ave., Nicetown.)—Chicago Office, 210 Monroe St.—Boston Office, 78 Chauncy St.

Crochet Lace Edgings

Spun Silk, Splicing Yarn, Mercerized Yarns, Cotton Warps, Sewing Threads, Tapes, Braids, Domets, Cambrics, Silesias. : : :

Write for Prices and Samples. George W. Chapin 229-231 Church St. PHILADELPHIA

the advance they anticipate, yet they will take small orders only, and expect by degrees to get the advance desired.

The dress goods manufacturers are busy and are getting some good orders. This class of trade has turned largely from the 1/4 Blood yarn and the trend is toward the finer grades.

Tops continue firm and prices are well maintained. Combers are busy and some of the mills are working overtime. There is a healthy condition prevailing among the mills and the outlook is hopeful. Buying is conservative in consequence of the high prices. If a new range of values can be established business will improve much.

We quote as follows:

2/40's Australian	1.20
2/40's XX Delaine	1.10
2/40's Half Blood	1.05
2/20's Half Blood	.85
2/36's 3/8 Blood	.75
2/26's 1/4 Blood	.68

Woolen Yarn.

Spinners of woolen yarn continue busy although there is a great deal of shifting from one class of work to another. Many old customers have been obliged to give up machinery space which has been immediately taken by some other manufacturer. There have been other reasons for shifting. Some weavers who had contracted to run certain machinery until January have found it impossible to carry out agreements on account of orders which called for the use of woolen yarn having shifted to a demand for worsted yarn. This space has been taken by weavers of worsted cloth who have been obliged to use woolen warp yarn in about 50 per cent. proportion with worsted yarn in order to reduce the cost of worsted cloth to meet the market requirements.

The hosiery manufacturers are using much more woolen yarn and when business becomes settled there willl be a great scarcity of woolen spinning machinery. The rubber boot lining trade demand will start in by the middle of next month and many orders will be placed for cheap yarn to make this class of goods.

Throughout New York state the knitters seem to be fairly busy, but are placing few orders for the better class of yarn and stock. It looks as if

You Save Enough Insurance to Pay for the Equipment.

So it costs you NOTHING to have the AMERICAN WATCHMAN'S CLOCK Fully approved by all insurance companies. We equip factories with Fire Alarms, Signals, etc., also Employee's Time Recorders, and Telephone Systems. Electric Time System consists of Master Regulator in office with secondary electric clocks throughout the mill. Insuring accurate time Send for particulars.

Pettes & Randall Co., 150 Nassau St., New York

Speed & Stephenson,
WORSTED and WOOLEN
YARNS
A SPECIALTY.
ALSO TOPS.
170 SUMMER ST., BOSTON.
Long Distance Tel. 4168-2 Main.

JENCKES SPINNING CO.,
Formerly E. JENCKES MFG. CO.
Carded and Combed Cotton Yarns for Weavers and Knitters.
Double and Twist Yarns for Woolen Trade.
PAWTUCKET, R. I.

WILLIAM B. CHARLES,
Cotton Yarns,
Cotton Cloth,
Silesia, Sateens,
For the Underwear Trade.
AMSTERDAM, N. Y.

GRANT YARN CO.,
COMBED AND CARDED COTTON.
YARNS 40's and above. AND
FITCHBURG, MASS. WARPS

FLOSSETTE MILLS
of the
New England Thread Co.
CENTRAL FALLS, - - R. I.
(DYERS and BLEACHERS) and MANUFACTURERS of
High Class Threads on Tubes, Spools and Cones and MERCERIZED YARNS for Knitting.
GLAZING OF YARNS
For the Shoe Lace. TAPE and WEBBING TRADE.

C. MOORE & CO.,
Manufacturers of
TWINES, THREADS AND YARNS,
Jacquard Harness Twines of all kind on hand and made to order.
S.W. Cor. Fifth and Market Sts., Phila.

Knitting and Weaving YARNS.

Cones, Cops, Warps, Skeins,
Single, Double, Three-Ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

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Of Two Evils, Choose Neither!

Don't use fluid oils, and oil your belts, your floors and your goods, as well as your bearings.
Don't use greases, which don't feed till the bearings grow warm, and leave a gummy residue behind, causing an increase of 25 or 30 per cent in the friction load.
Use **NON-FLUID OILS**, which don't drip like the corresponding fluid oils, nor inflate your coal bill like greases.
Our booklet tells why. May we not send it to you, with free samples to prove our claims? Better write to-day.

NEW YORK & NEW JERSEY LUBRICANT CO.,
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JOSEPH M. ADAMS CO.
WOOLEN YARNS,
Carpet Backing and Rug Yarns a Specialty.
ARCOLA MILLS,
Main St., foot of Centre St., Manayunk, Phila.

Woolen and Merino Yarns,
1 to 10 Runs, at reasonable prices.
All Wool, Mohair and Wool Spun or Mixed Cotton and Shoddy Yarns, in white, gray, and colors.
Dress Goods Yarns a Specialty.
E. M. ROCKWELL, - - LEOMINSTER, MASS.

E. G. HARPER,
WORSTED and WOOLEN YARNS,
MERCERIZED COTTON,
395 BROADWAY, TEL. 1080 FRANKLIN NEW YORK.

SHODDY WM. H. H. SLACK & BRO., Springfield, Vt.
Carbonized Stock a Specialty. **FLOCKS**

M. B. SCHWAB, Pres. H. RAWITSER, Treas.
ED. GLUECK, Sec. and Gen. Mgr.
RIVERDALE WOOLEN CO., MANUFACTURERS OF
.. Shoddies ..
Of every description. Capacity 7,000,000 pounds per annum.
Custom Carbonizing and Garnetting a Speciality.
New York Office. 140 DUANE STREET. RIVERDALE, NORTHBRIDGE, MASS.

YARNS Solis, Boston.
77
SUMMER STREET.
ANDREW J. SOLIS, Jr. & CO.

many of the manufacturers would wait until November before placing orders for fine wool such as Nevada lambs and Australian lambs. Nevada carbonized lambs are selling for 65 cts. per pound while Australian carbonized is selling at 77 cts. per pound and these lambs are scarce on this market. It is probable that the new Australian lambs' wool for delivery in February and March will sell at a less price than that which is owned to be delivered immediately.

Many of the knitters understand that buying for future arrival will enable them to save 5 to 7 cents per lb. and many are working on this basis. There is much fine Australian thread being imported, but the supply of both fine foreign and domestic thread is scarce because all the spinners have been working on the coarse grades of wool, making coarse yarn. Black wool is scarce and high, some of the top grades selling for 70 cents per pound. Black tops are also scarce and the stock is largely in the hands of one business house. The Government will soon call for underwear with black tops as a component part and this demand with a limited supply behooves careful buyers to supply themselves.

Rag and Shoddy Market.

Prices of rags and shoddy have continued firm in sympathy with the strong position of wool, but the volume of trade has been small and business restricted to actual requirements which at this season of the year are always small. In spite of the limited demand, however, owners of rags have maintained prices and in some cases actually advanced them. Wool wastes are also firmer and there is an undoubted scarcity of the better quality. While the high price of wool warrants the belief that manufacturers will turn their attention to wool substitutes, this influence cannot in the nature of things cause an improvement in the demand for shoddy and waste this season, as samples are already on the market and the general character of the fabrics established beyond the possibility of a change. If, however, the present prices of wool are maintained and further advances occur, it is certain that the heavy weight season will witness a material increase in the consumption of shoddy. We quote as follows:

In Textile Mills
Warren's Pulley Cover
is the best and most economical belt slipping preventative. It is used by many of the best mills in the United States.
Any careful man can apply it.
Sufficient for 40 sq. ft., $5; 125 sq. ft., $12.
If your supply house does not sell it, order direct.
The Warren Co., Mfrs., 25 E. Chicago Ave., Chicago, Ill.

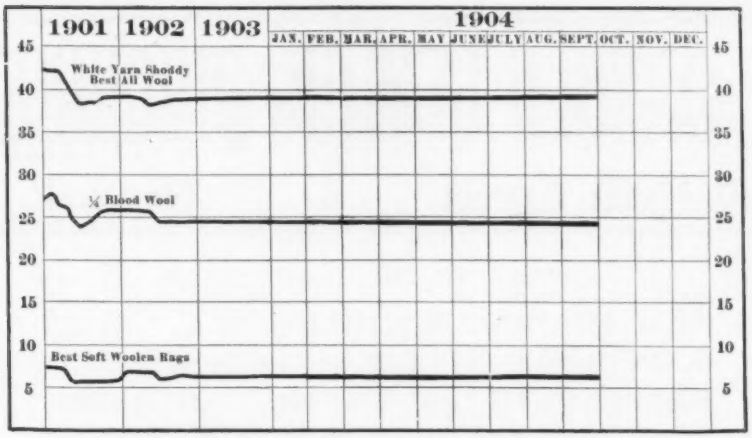

CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

SHODDIES AND EXTRACTS.

White yarn, best all wool	38-40
White knit, all wool, best, fine	28-32
White knit, No. 2	23-25
Light yarn, extra fine	25-28
New pure indigo blue	23-25

Merino.

Fine light, all wool, No. 1	24-25
Medium light, all wool, No. 1	16½-17½
Medium light, all wool, No. 2	14-16
Fine black, all wool	20-22
Fine dark, all wool, best grade	20-21
Medium dark, all wool, No. 1	13-15
Medium dark, all wool, No. 2	12-13
Red knit stock, strictly all wool	19-20
Red flannel, all wool	19-20
Dark blue for hosiery, strictly all wool, No. 1	17-20
Dark blue for hosiery, not all wool, No. 2	12-14

DELAINE EXTRACTS.

Light	19-22
Medium light	15-17

WOOLEN RAGS.

Regular gray	12-13
Black	14-15
Fancy colors	16-20
Fine merchant tailors, all colors	9-11
Choice light colors	13-15
Browns	12-13
Blacks	9½-10½
Fine blues, plain	9-11
Fine dark	10-11
Medium dark	7-8

Worsteds.

Blue	16-18
Black	18-20

Serges.

New black	15-16
New blue	14-15

Flannels.

New scarlet	18½-22
New blue	17-18
Cloakings	3-4

SOFTS AND KNIT STOCK.

Soft woolens, best	7-7½
Old white flannels	14-16
White flannels, No. 2	11-12
Old red flannels	9½-10
Light blue flannels	7½-9
Old blue flannels	6-7
Fine worsted, new black	26
New blue clip, best, fine	20-22
Dark mixed yarn, extra fine	22-24
All wool yarn, medium and coarse grades	15-20
Old plaids	5-7
White stockings	17-18

WOOL WASTE FOR SALE.

No. 41,390. About 20,000 pounds. Greyish brown mix. Fine medium quality, good staple.
No. 41,391. About 10,000 pounds. Straight black. Medium coarse, fair staple.
No. 41,392. About 8,000 pounds. Coarse dark brown mix. Short staple.
No. 30,163. About 60,000 pounds. Medium quality, good staple, dark brown mix.
No. 30,234. About 175 bags. Black. This is medium quality, good staple.

All the above lots are quite clean and dry, except the last number, which consists of about 70% of scoured wool card waste, and about 30% of unscoured. It also contains a small percentage of fast black cotton.
No. 30,163 shows about 25% of cotton. All other lots are supposed to be all wool. Samples sent on application.

Address Dept 7.
CHAS. W. BECKER, Agent, AMSTERDAM, N. Y.

WILLIAM B. CHARLES,

Cotton and Cotton Wastes

Amsterdam, N. Y., U. S. A.

COTTON YARNS.

Contracts made with Cotton and Woolen Mills for Yearly Waste Production. Correspondence solicited. Shepperson's Code, 1878. Cable Address "Charles."

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216-20 High Street, .. Newark, N. J.

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NEW SEAMING MACHINE with a **MAINTAINED SPEED OF 4,000 STITCHES PER MINUTE** and **CAPABLE OF BEING RUN AT 5,000 STITCHES PER MINUTE IF DESIRED.**

¶These machines embody all that is **newest** and **best** in this class of machines, and is **perfect from a manufacturing point of view.** ¶Also manufacturers of **high speed welting, edging, hemming** and **sweater machines.**

CORRESPONDENCE INVITED.

White hood stock	20-21
Clear hoods	9-10
Red stockings	9-10
Blue stockings	7-8
Fancy stockings, No. 1	7-9
Gray stockings	9-10
Black stockings	9-10
Knit stock comforters	6-7½
Red knit	9-10
Light gray knit	9-10
New light fancies	16-18
New fancies	12-14

Merinos.

Light, fine	13½-15
Light, coarse	7¼-8
Fine, dark	12-13
Dark, No. 2	8-9
Coarse dark	5-6
Blue	12-13
Blue-seamed	13-14
Black—unseamed	12-13
New black	18-20
Small	3¼-4
Panting	6-8

FLOCKS.

Shear, fine white, all wool	9-11
Fine indigo blue, all wool	9-9½
Fine black, and blue, all wool	7-8
Fine dark, all wool	5-6
Gig, fine, all wool	3-4
No. 1, black, all wool cut	6-7
All wool, fancy, shear and gig	2½-3½

NOILS.

Australian	48-50
Fine domestic	38-40
½ Blood	24-28
⅜ Blood	22-23
¼ Blood	17-19
Braid	21-22
Carpet (white)	14-18
Carpet (colored)	10-12½

Seedy.

½ Blood	35-37
⅜ Blood	27-30
¼ Blood	23-26

COTTON WASTE.

No. 1 Spinners	9⅜-9½
No. 1 Machine	7-7½
No. 2 Machine	5½-6¼
Machine Cop	8-8¼
No. 1 Cop	9-9½
No. 1 Card	8¼-8¾
No. 2 Card	7½-7¾
No. 1 Oily Card	4¼-4½
No. 2 Oily Card	3½-3¾
Egyptian Card	Limited quantity
Peeler Combing	10¼-10½
Egyptian Combing	Limited quantity
No. 1 Linters	5¾-6¼
No. 2 Linters	5-5½
White Clips	8-8½
Colored Clips	5-6
No. 1 Picker	2-3½

AMERICAN DYEWOOD COMPANY

FAST ACID BLACKS

FOR WOOL

DYE IN ONE OPERATION WITHOUT AFTERTREATMENT

TETRAZO SULPHUR BLACKS

FOR COTTON

DYE IN ONE OPERATION WITHOUT
AFTERTREATMENT OR OXIDATION

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FOR ALL PURPOSES.

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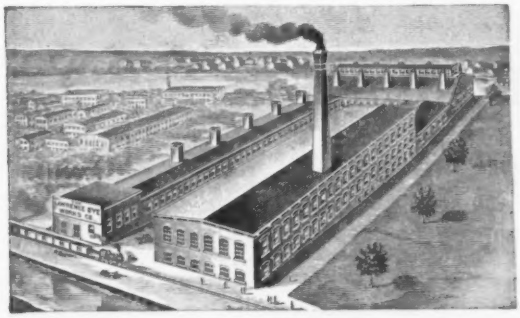
THE LAWRENCE DYE WORKS COMPANY

LAWRENCE, MASS.



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Re-Dyers and Re-Finishers of Worsteds and Woolens.
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We are sure we can give you better work and better service that you can get elsewhere. A trial will convince.

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BLEACHING, DYEING and MERCERIZING of all grades of Cotton Yarn,

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Fast Black Dye Works

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Cleans Wool, Floors, Anything.

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Fast Colors for the Woolen Trade. Capacity 20,000 lbs. per day.

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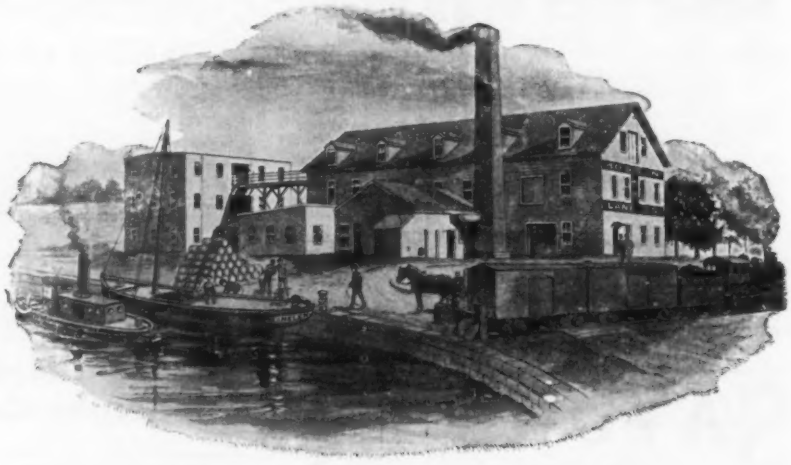

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For all Kinds of Fabrics, Dyeing Perfectly Level Shades. Aniline Colors for Cotton, Wool, Silk, Paper and Leather.

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HEMOLIN IS BEST

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A perfect solvent of grease in any form, can be used on Raw Wool, Yarns, or Piece Goods.
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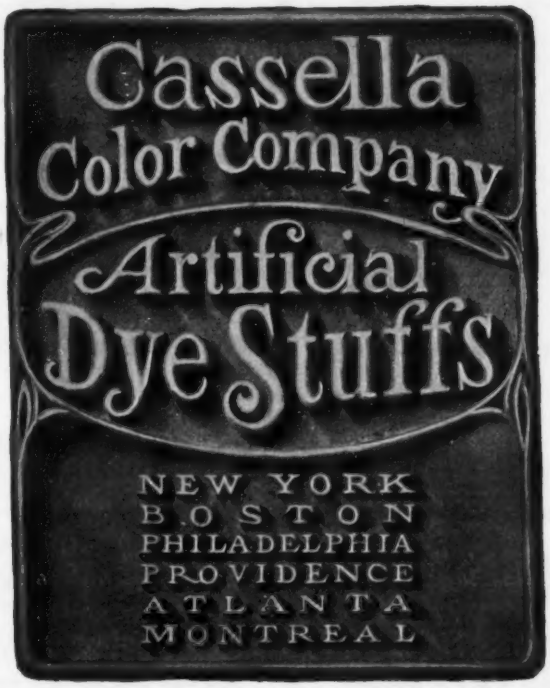
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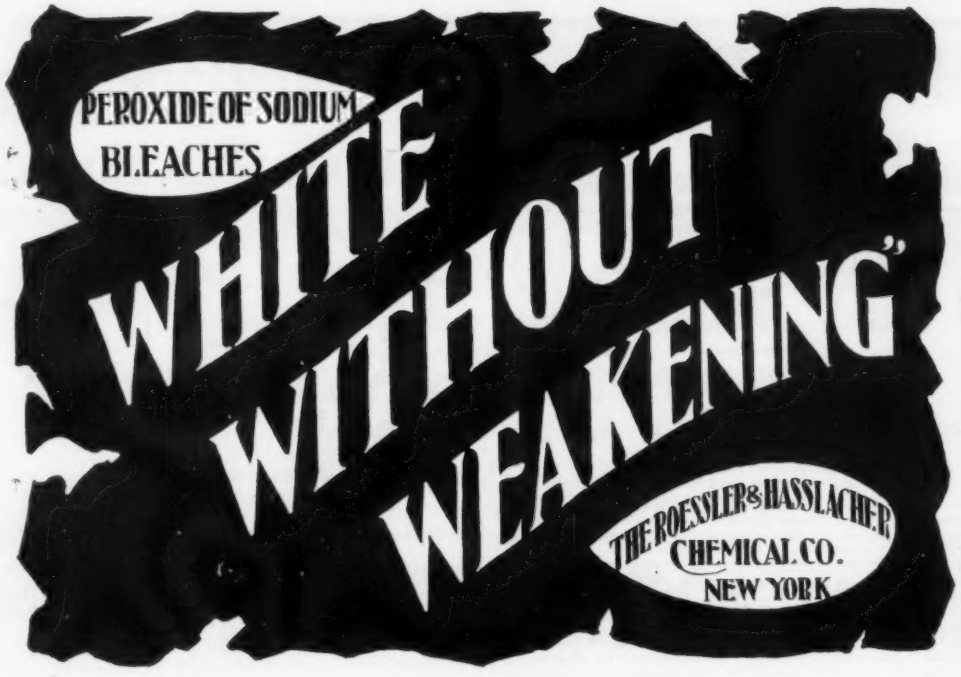
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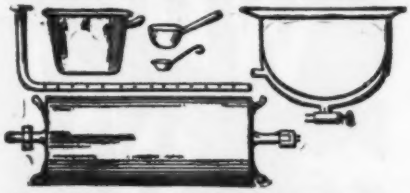

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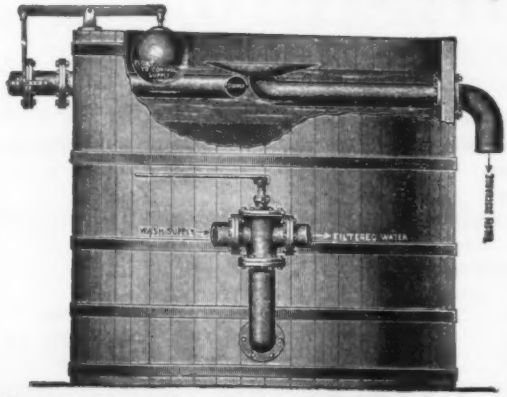

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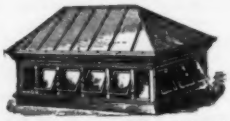

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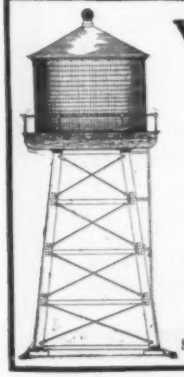

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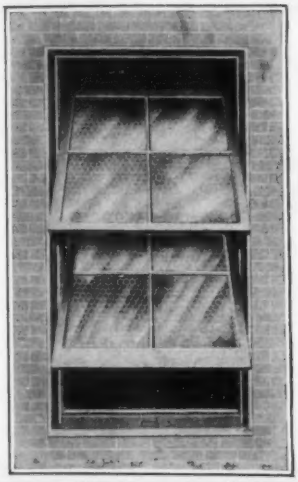

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and stop it quicker and easier when it originates inside, if your window openings are protected by wired glass, set in

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The reasons why the Lupton Window is superior, are clearly set forth in our book about fire-proof windows. Sent on request.

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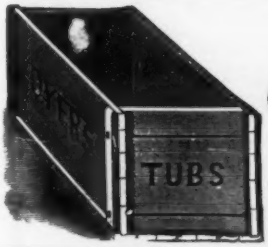

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Tubs and Tanks of all kinds for Dyers, Bleachers, Factories, etc.

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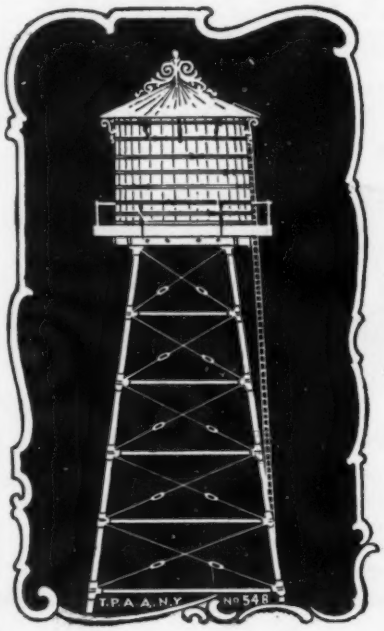

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Of Steel, Of Wood, Of Wood and Iron.

All Strong and Good.

First cost is the determining factor in your choice. For full particulars read our catalogue.

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For Removal of DUST, HEAT, ODORS, STEAM, SMOKE, MOISTURE AND GASES, AND FOR ALL SORTS OF DRYING AND . . . . . .

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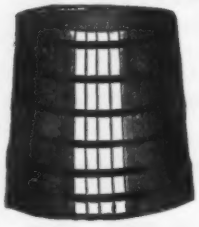

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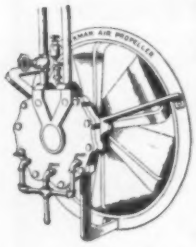
With Direct Connected Engines.



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Can be run at any speed and any time. No long shafting and belts to waste power.

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Perforated Copper

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Applied to Cloth, Wool, Cotton, Drying Rooms, Tables or Machines makes a guaranteed increase of 25 per cent.

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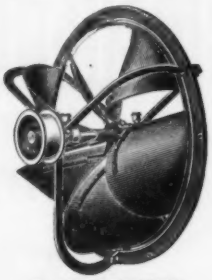
This is the Berry Wheel, the most efficient agent for moving air, eliminating steam and other impurities in the atmosphere.



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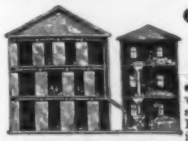

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For the handling of wool and cotton stock, rags, excelsior, jute and all kinds of fibrous material, wet or dry. Also spool elevators, steam heating and ventilating, and mill work generally. Blower and fan work a specialty. This conveyor is patented. Beware of infringement.

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WOOD, ZINC & HALF-TONE ENGRAVING.
KNITTING MACHINERY & ALL KIND OF MECHANICAL WORK OUR SPECIALITY.
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They want to get in touch with a brainy, experienced operator, who can subscribe some stock and assume active management of the plant.

The immediate section produces cotton of the finest staple; the farmers themselves have subscribed stock and are interested in the success of the venture. Cheap fuel, intelligent white labor, low rates on the finished product, are some of ths attractive features.

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If you want to move your plant South write us.

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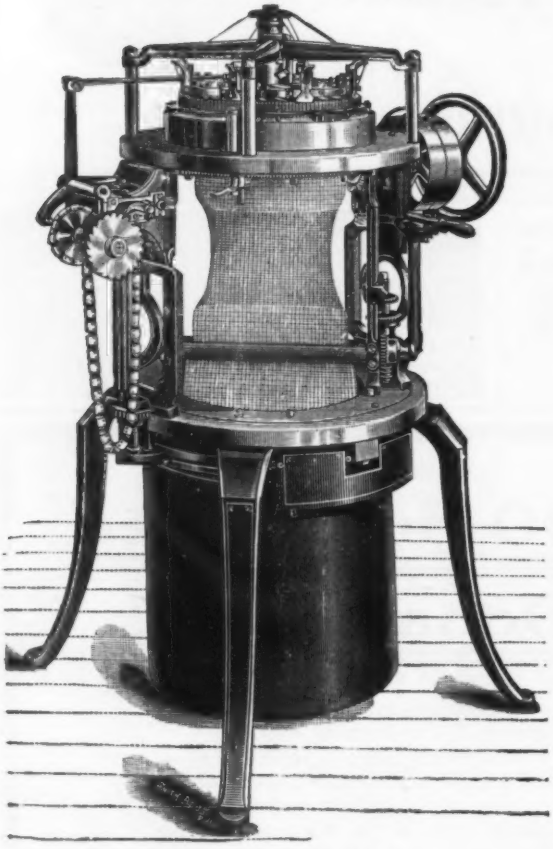
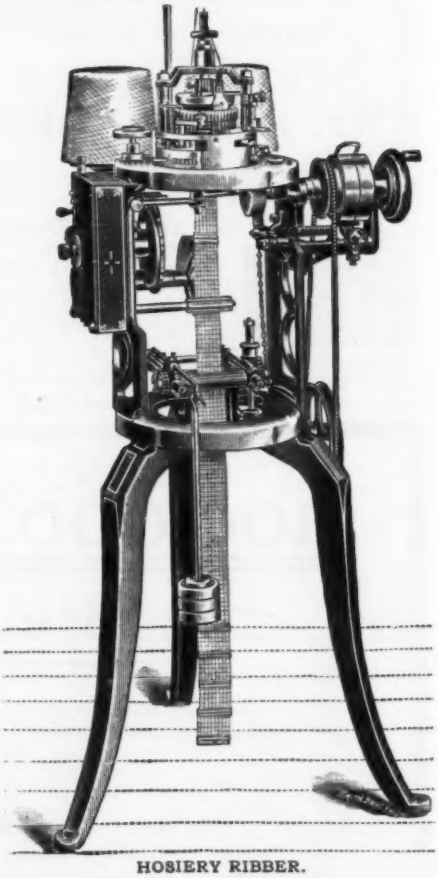
AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



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ESTABLISHED REPUTATION FOR LARGEST PRODUCTION, BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION

Full Particulars, Description and Samples Furnished upon Application to the

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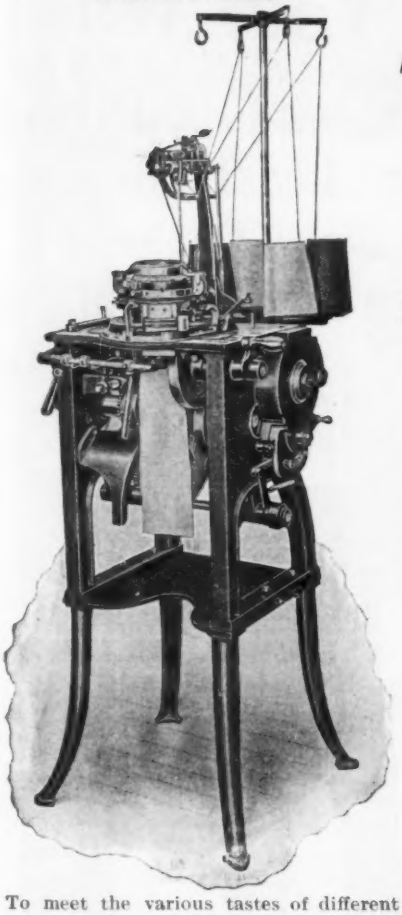

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Two Leaders

Fully Automatic Hosiery Knitters

For Making all Kinds and Gauges of Seamless Hosiery

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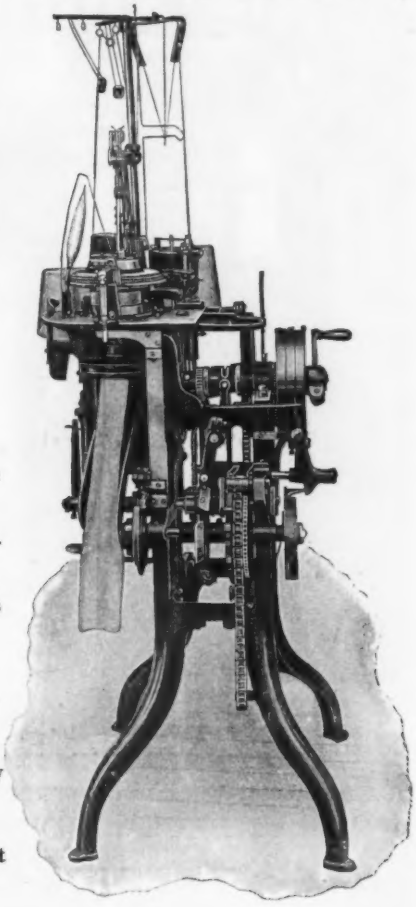

One with

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the other with

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for pattern mechanism

To meet the various tastes of different manufacturers. Both used and approved by leading hosiery manufacturers.

Both contain all the well-known essentials demanded of first-class knitting machines.

With these two machines we can supply all the manufacturer's possible wants in the best possible manner.

Write us for further particulars and prices.

We also make all kinds of LATCH NEEDLES.

Many leading manufacturers use our needles and say they are the best on the market.

Send us a trial order.

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This machine can be seen in operation at his office.

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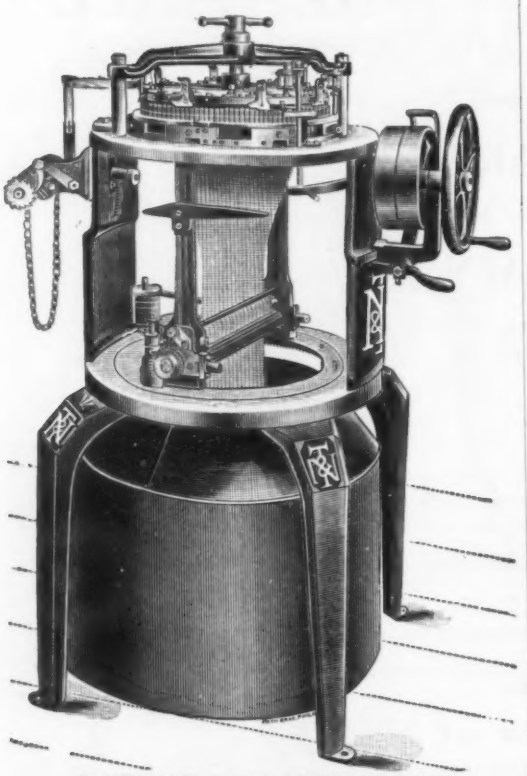
Circular Rib Knitting MACHINERY

For making Ribbed Underwear, Combination Suits, Sweaters, Cuffs, Shirt Borders, Hosiery, etc. : ; :

Correct Construction. Excellence and Durability.



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QUALITY OF FABRICS AND PRODUCTION
UNEXCELLED

NYE & TREDICK CO.
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Largest Production For Least Money

Write

Geo. D. Mayo Machine Co.
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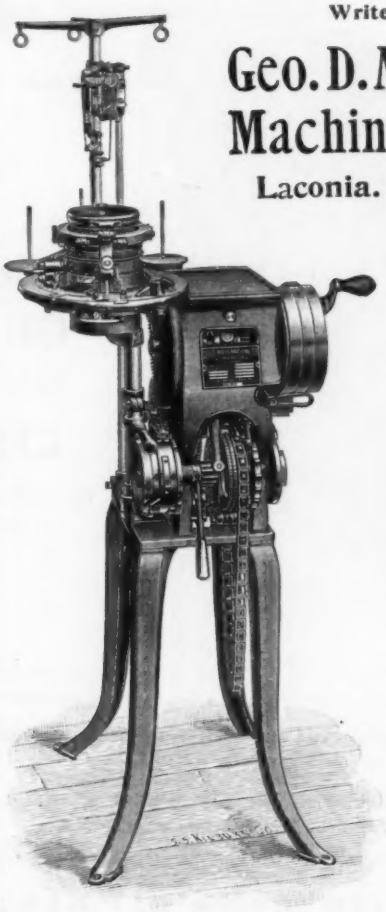

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MAYO'S

New Full Automatic Knitter.

The Old Reliable

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Unequalled Facilities for Prompt Deliveries of Any Quantity.

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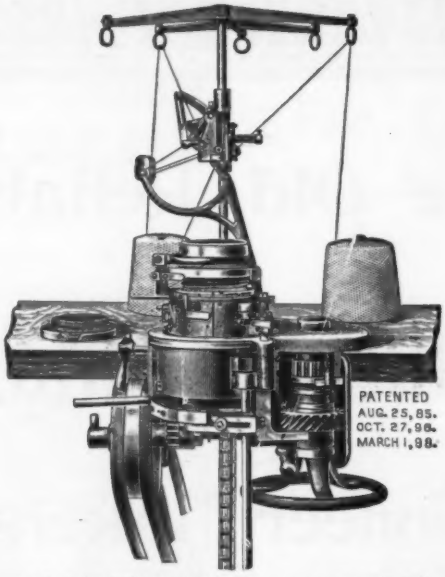
The "INVINCIBLE" is reasonable in price.

It's best advertisement—the recommendation of its users.

Its METHOD of TRANSFERRING is still the best.

Others try to imitate.



Full Automatic Knitting Machine

"The Knitter That Knits."

Leads Them All.

Write for Catalogue.

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The Merrow

High Speed Overseaming, Overedging and Scallop Stitch Machines

are LIGHT RUNNING, FAST and DURABLE.

OUR NEW STYLE 60 MACHINE for Trimming and Overseaming in one Operation produces the strongest, best Seam and does it with the greatest economy.

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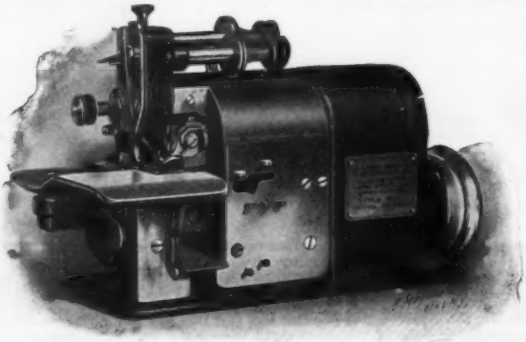
For Necks and Fronts of Rib Goods, produces the most showy, substantial finish.



USE STYLE 17 or 22 for Bed Blankets and STYLE 18 for Horse Blankets.

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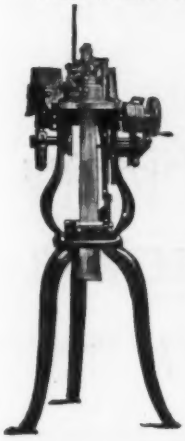

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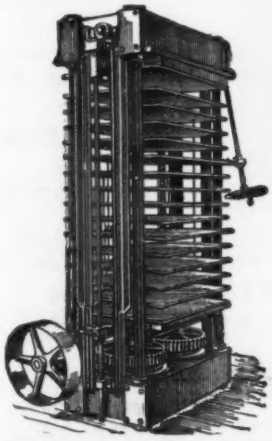
Automatic Welt and Loose Course Machines for Stock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Short Cuffs, Sock Tops, Hose Legs, Wristers, etc.

Golf and Bicycle Stocking Machines,

ALL KINDS OF

CIRCULAR RIBBED MACHINES

For Men's Underwear, Ladies' and Misses' Hose Legs and Leggins. **Correspondence Solicited.**



Reliance Hot Plate Press

For Hosiery and Underwear Trade.

For price and particulars address

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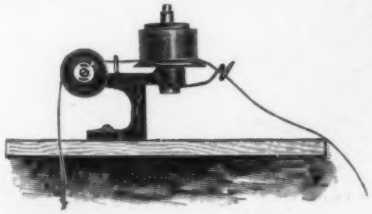

Best Machine on the Market.

Over 1500 Now in Use.

Ask for Particulars.

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An Effective Label

well put on, wire costing one cent per 1000 stitches.

Complete Outfits of

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An extract from purchaser's letter:

Gentlemen:—

Since using your Brehmer Wire Stitching Machine, we have impressed on each garment over 2000 dozen at a cost of only 40c. outside the price of machine. Whereas the same amount of pin-fastners would have cost us $13.50.

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PLATE PRESS

For Knit or Woolen Goods.

The most reliable machine of the kind on the market.

PRESS PAPERS and FENDERS.

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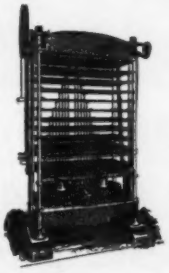
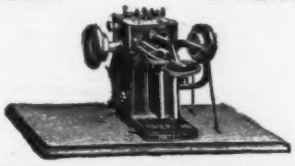


AMERICAN OVERSTITCH



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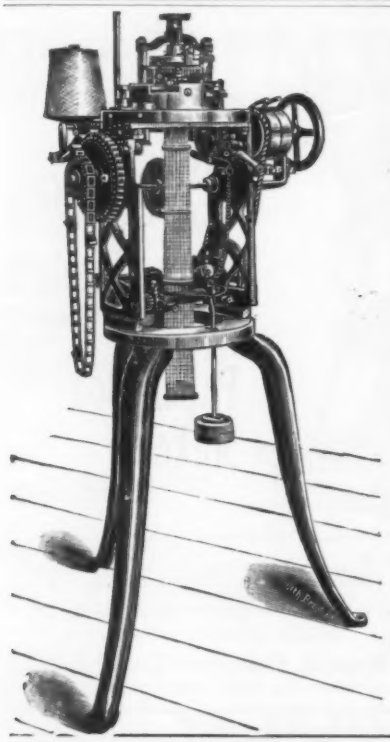

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BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

The cut shows our **Improved Automatic Ribber** with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.

WALTER SCHOEBEL, Springfield Ave. and 7th St., Newark, N. J.

Sole Agent for the U. S. for

Jaquard and Burl-machine

FOR POWER-MOTION

Making automatically front parts of hunting-vests, petticoats, etc.

Our machines are known as the Best Built especially as to workmanship and durability.

BUILT SOLELY BY

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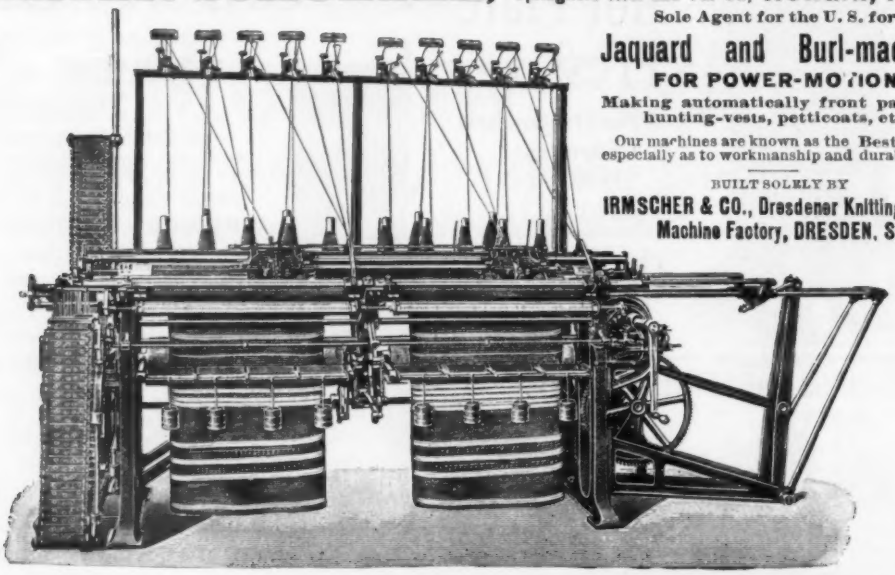


SWEATERS.—This machine is built with 1 or two sections which work together (dependently of each-other) and produces all patterns which could be made hitherto on Hand-Jaquard- and Burl-machines automatically in endless pieces with dividing thread. We are ready to wait on with collection of same which will be the best recommendation, and here we will mention but to following advantage of this machine which is constructed very geniously: It is provided with autom. racking-apparatus as far as 6 needles, special cams for double rib, autom. change of all middle and wing-cams, 2 thread-carriers, autom. change of colors, special attachment for locking in the loops and electric stop-motion in case of yarn-breaking, knots, etc.

All these apparatus are set to work by the pattern-chain, consisting of a number of Jaquard-cards. This new arrangement which is our invention enables the knitter to put together any pattern, making the necessary cards by means of a stamp and after a table we subjoin.

Special Hand and Power Machinery for Fancy Gloves, Sweaters, Golf Hose, Ladies' Blouses, Etc.

CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete, for

Ribbed Underwear, Sweaters, Cardigans, Cuffs and Anklets.

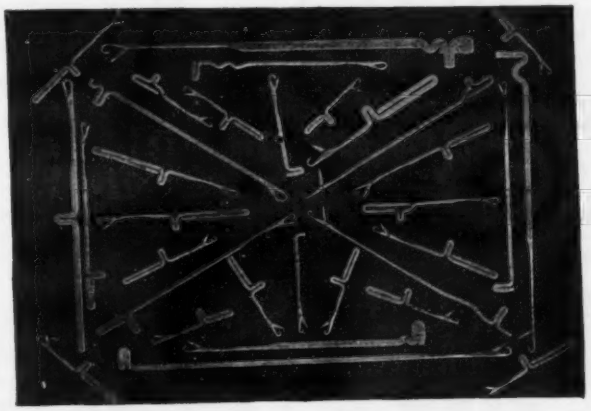
The Leighton Circular Machines are the only ones which **Rack** or **Shog** the needles for fancy borders; also built for automatic striping; and with from 4 to 16 feeds for underwear.

Also Builders of ABEL WINDERS, SEAMERS and LOOPERS.

LEICHTON MACHINE CO.,
Manchester, N. H.

Latch Needles

For all Knitting Machines.



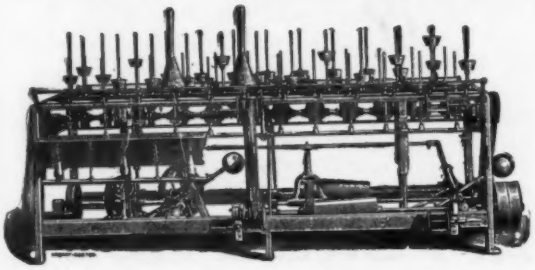
Our Superior or Sunken Rivet Head Needles

Will save you money every day in the year.

Dodge Needle Co., Manchester, N.H.

We now build, with or without differential motion, for winding on Bobbins from Skein or Cop,

THE ABEL WINDERS



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Abel Seamers and Loopers

IN CONNECTION WITH OUR LINE OF

AUTOMATIC RIB KNITTING MACHINERY.

LEIGHTON MACHINE CO., Manchester, N. H.

JAMES TAYLOR,

835 Arch Street, - - - Philadelphia, Penn.

KNITTING MACHINERY

OF ALL KINDS. NEW AND SECOND HAND.

A RARE OPPORTUNITY TO BUY.

50 New Victors, various sizes.
28 Beattie & Hepworth loopers.
4 Corneley embroidery machines.
10 Hosiery presses (lever).
1 Bruce folder and cutter.
11 Lamb and Grosser sweater machines.
150 Ribbed underwear machines, various sizes and makes.
1 Speed lathe. 1 Sensitive drill.
60 Brinton & Co. ¾ aut. knitters, sizes.
27 Standard A machines.
56 Union Special machines, various styles.
2 Singeing machines.
2 No. 50 Merrow machines.
5 Mayo machines.
100 Brooks welters.
1 Ardrey fleecing machine.
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2 Smith & Drum singeing machines.
250 Doz. Cyclone underwear dryer.
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1 Industrial over-seamer.
2 Typewriters.
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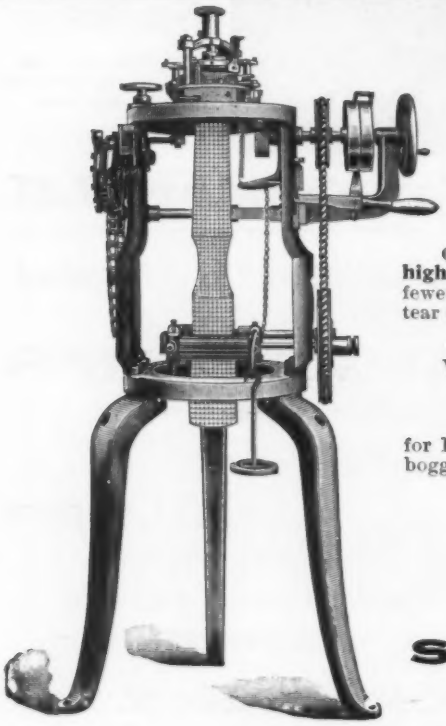
5 Band folding and cutting machines.
1 48 spindle Payne Cop winder.
1 Hemphill Rib-cutter.
15 Standard B. machines, 200 needles.

WRITE FOR COMPLETE LIST.

APPRAISEMENTS A SPECIALTY.

We are always in the market to buy good second-hand Knitting and Finishing Machinery.



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at **very high speed,** giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

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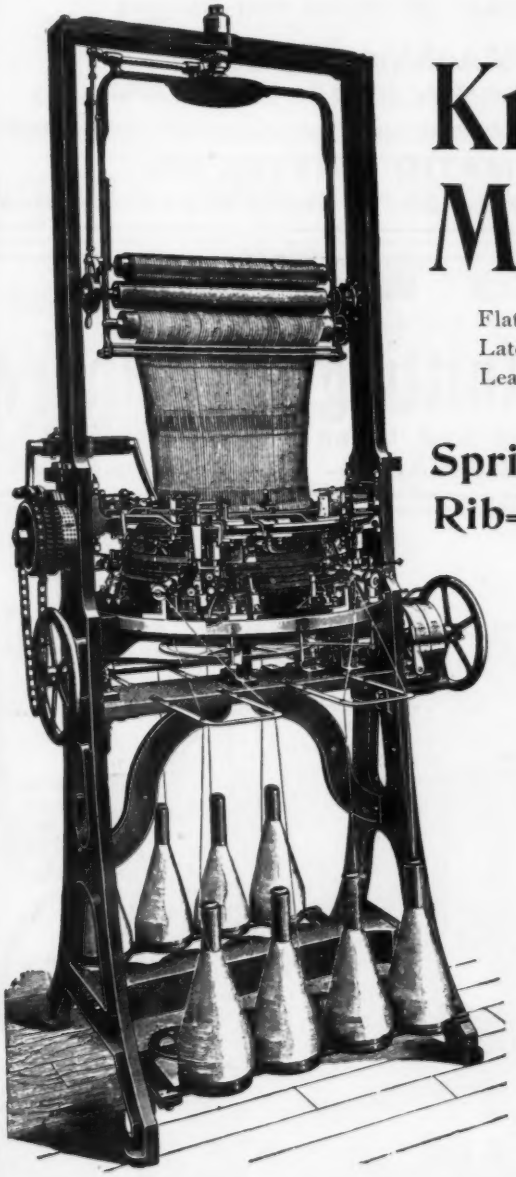

MANUFACTURER OF

Knitting Machinery

Flat and Circular Rib, both Spring and Latch Needle, Plain Circular Machines, Lead or Trick Cylinder.

Spring Needle Cylinder Rib-Top Machines

For making Cuffs, Drawer Bottoms and Shirt Borders.

Spring and Latch Knitting Needles,
Burr Wheels, Burr Blades,
Sinkers, Jacks, etc.

Collarette Attachment

EUROPEAN OFFICE:
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C. J. Sibbald, General Representative,
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SMALL RIB MACHINES
CROCHET MACHINES

NATIONAL

SHELL STITCH
MACHINES

Spring Beard Needle Machine
For SEAMLESS HOSIERY, Plain and Novelties

Automatic Rib Machine
For RIBBED UNDERWEAR. All Styles and Gauges

Over Seam Machine "Champion Improved"
For Welting Seamless Hosiery. Covering Raw Edges of Rib Fabrics.

NATIONAL AUTOMATIC KNITTER CO.
724-726-728 Cherry St., Philadelphia

SEND FOR FULL PARTICULARS

WOLFGANG RICHTER,
Importer and Builder of
Full Fashioned Knitting Machinery
N. E. Corner Third and Green Streets,
PHILADELPHIA, PA.

"The best is cheapest."

The Knitting Machines Made by

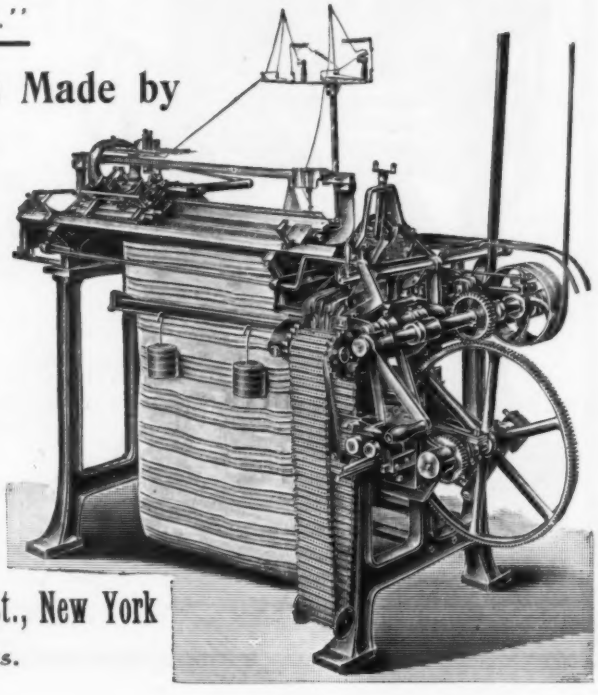
WILHELM BACH,

Apolda, Germany

are made of the highest grade tool steel, best constructed, and more durable than any other machines on the market for

Knitting Fancy Vests, Sweaters, Golf Jackets, etc.

Fully Automatic Power Machines a Specialty.



D. Rheinauer & Co., 136 Greene St., New York
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PAXTON & O'NEILL'S

3-4 AUTOMATIC KNITTER

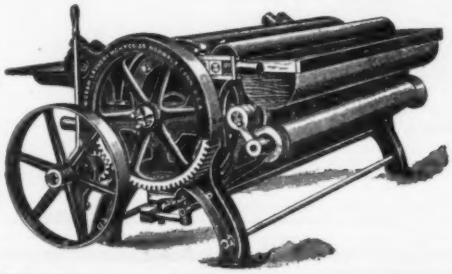
FOR ALL KINDS AND GUAGES OF SEAMLESS HOSIERY.

Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and bet'er goods. Costs less for repairs. Gives less trouble to fixers. Range on Half Hose, from the coarsest to 260 needle.

Exclusive rights to BROWN'S ATTACHMENTS FOR LACE EFFECT.

Cylinders and Dials for all size Machines. **127 Bread Street, Phila.**

AUTOMATIC IRONING and PRESSING MACHINE for KNIT GOODS.



This machine irons and presses ribbed and flat underwear, giving a fine, smooth finish and most attractive appearance to the goods, not to be obtained in any other way. It does not break buttons. Inexpensive and easy to operate, and has large capacity. Knitting mills using them are greatly pleased with results. This method of finishing is sure to come into universal use. Send for further particulars to

J. W. CRAW LAUNDRY MACHINERY CO.,
SOUTH NORWALK, CONN.

HEPWORTH & CO.'S

Patent Single-Stitch

LOOPING MACHINE.

Needle working from the inside, avoiding the breaking of needles and points and picking up the metal.

Single and Double Stitch, or Both Combined.

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Drying Forms.

BOARDS FOR FAST BLACK DYERS.

HOSIERY FINISHING BOARDS.

BEST WORK. PROMPT SERVICE. PRICES ALWAYS RIGHT.

JOS T. PEARSON 1815-21 TAYLOR ST. KENSINGTON PHILA.

Hosiery Boards.

EXCELSIOR KNITTING MACHINE MFG. CO.

BUILDERS OF

Full Automatic Knitters

WITH OR WITHOUT

Transferring Device

ALL SIZES AND GAUGES, 2 1-4 INCH TO 4 INCH

MEADOW AND WASHINGTON STREETS ALLENTOWN, PA.

Irregular Form Cutting Machine

For Cutting Curved Drawer Bands, Pockets, Gussets, Fans, Etc. In fact almost any irregular shape can be cut on this machine, which is the only one of the kind made especially for this purpose.

Special Machines for Knitting Mills

Band Folding and Cutting Machines, Power Neck Marking and Shaping Machines, Hand and Power Cloth Cutters, Flat Rib Cutters, Folders and Winders, Loopers, Hot Roll Folders, Eyelet Machine, Irregular Form Cutting Machines. Also Full Line of Knitting Mill Suplies.

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THOMAS KENNEDY & SON,

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Builders of
Steam Presses,
Oxidizers,
Chromers,
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Pumps,
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STEAM PRESSES, HOSIERY-FINISHING AND DYE HOUSE MACHINERY.

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IRON WORKS,

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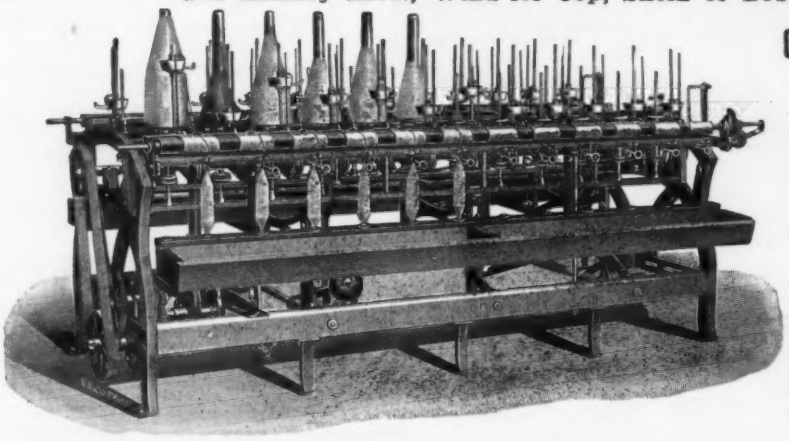
Hosiery and Laundry Dryers.

Complete Dye Plants Erected.

GEO. W. PAYNE, Prest. J. MILTON PAYNE, Treas. CLINTON F. PAYNE, Sec'y.

OVER 1,650 PAYNE WINDERS IN USE

For Hosiery Mfrs., Wind for Cop, Skein or Bobbin.



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[Est. 1865. Inc. 1903.]

Builders of the

Improved

Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

Doubling Spoolers, for doubling 2, 3, or more ends into one,

Upright Quillers, Quill from Cop, Skein or Bobbin.

Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

OFFICE, 102 BROAD STREET
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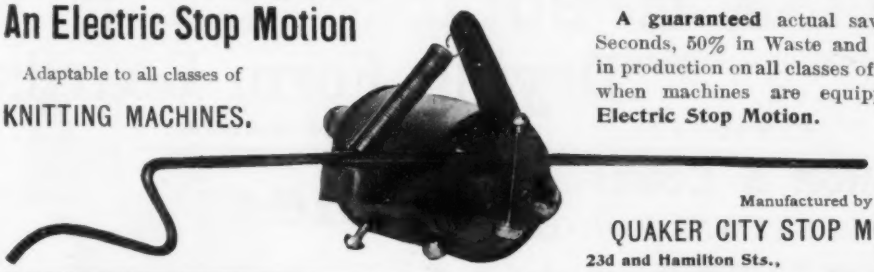
An Electric Stop Motion

Adaptable to all classes of

KNITTING MACHINES.



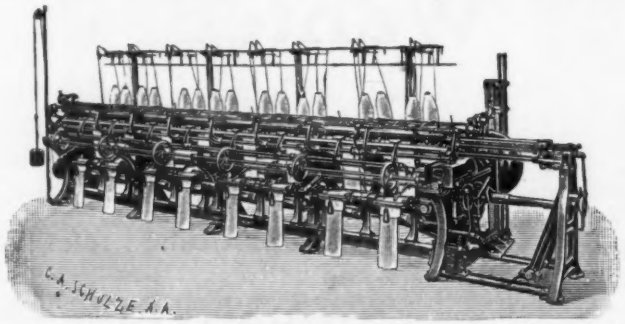
A guaranteed actual saving of 90% in Seconds, 50% in Waste and a 30% increase in production on all classes of Knitted Goods, when machines are equipped with this **Electric Stop Motion.**

Manufactured by

QUAKER CITY STOP MOTION CO.,

23d and Hamilton Sts., Philadelphia, Pa.

SEYFERT & DONNER, CHEMNITZ, GERMANY.



BUILDERS OF ALL KINDS OF

Flat Knitting Machines

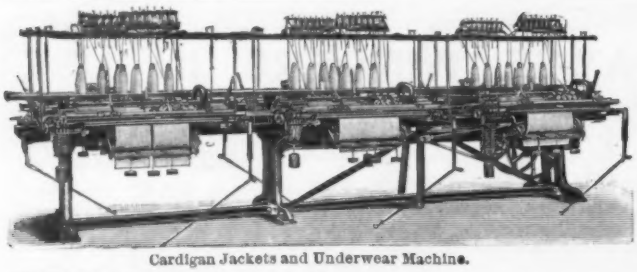
(LATCH NEEDLES)

This cut shows the **AUTOMATIC NARROWING MACHINE**, eight at once, for the manufacture of plain, seamless legs of Ladies' hose in endless bands with dividing thread. These legs, footed on the Circular machine, give the most perfect and cheapest full fashioned seamless hose that ever existed on the market.

N.B.—Narrowing Machines are built in various types for the manufacture of all kinds of underwear, garments, etc

FULL AUTOMATIC POWER KNITTING MACHINES—Independent Heads. Patentees and sole makers of the "**TEUTONIA**," best and quickest hand-knitting machine for hose and half hose. Griswold heel, narrowed toe.

Sole Agent for the United States, JULIUS MULLER, 132 Melrose Street, Brooklyn, N.Y.



Cardigan Jackets and Underwear Machine.

AUTOMATIC

Knitting Machines

For Plain and Fancy Goods.

THE BEST IN THE MARKET!

Special Constructions for different articles!

INDEPENDENT HEADS.

DOUBLE SYSTEM OF LOCKS.

Double-side Power Stands, 6 at once.

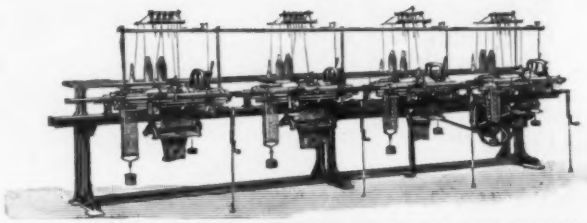
Paris, 1900, Gold Medal.

Ask for samples and particulars, state guage and size you want.

CLAES & FLENTJE,

Mülhausen, Thür, Germany.

Representatives: Ainslie Knitting Machine Co., Ainslie & Humboldt Sts., Brooklyn, N. Y., where all kinds of hand and power machines can be seen working.



Automatic Widening Machine for Sleeves, Drawers, Garments, Plain and Ribbed.

WILLIAM C. BULL, BENNINGTON, VERMONT.

MAKER OF

For Ladies', Gents', and Children's Goods.

LATEST STYLES.

BEST WORKMANSHIP.

Drying Form Boards

OF EVERY VARIETY.

Stanton & Lewis

CENTRAL STEAM FORGE

316 and 318 Florist St.,

PHILADELPHIA .. .. PENN.

The best equipped shop in the United States for the Manufacture of

Knitting Machine Cylinder

and Sinker Bed Ring Forgings, from the smallest to 30 in. dia. of the best steel.

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60½ and Media Streets, . . . PHILADELPHIA.

GAS ENGINES for city or country
BRUSHING MACHINERY
KNITTING MACHINERY

EFFICIENT
DURABLE
LOW IN PRICE

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HOSIERY PRINTER.

2-COLOR WORK A SPECIALTY.

Printing Blocks made for the Trade. Best Work.

Special Designs a Feature. Lowest Prices.

Hosiery Man Wanted

Owners of hosiery mills in the South want to secure practical hosiery man to take charge of the plant, who will invest about $6,000.

For further particulars refer to file 9112 and address,

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Land and Industrial Agent, Southern Railway,

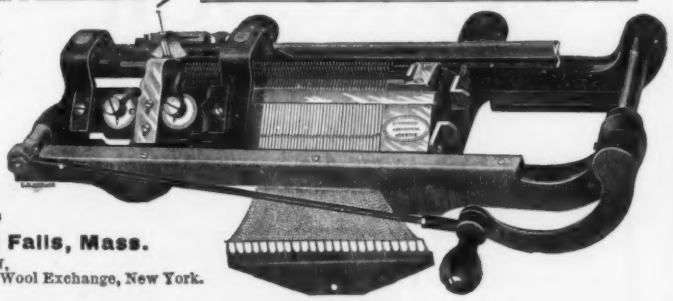
WASHINGTON, D. C.

The LAMB, LEADER OF KNITTERS,-

Original and Still the Best.

Most widely used; being operated in every civilized country in the world. For description, prices, etc., see catalogue.

CIRCULAR MACHINES,
RIB TOP and
SEAMING MACHINES.

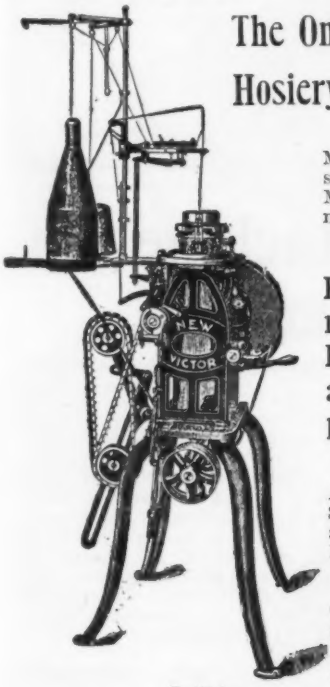


LAMB KNITTING MACHINE COMPANY,

P. O. Box 5888, Chicopee Falls, Mass.

J. E. WOODHEAD, 100 22d St., Chicago.
L. D. SANBORN, Room 505 Wool Exchange, New York.

The "New" Victor



The Only Reliable Hosiery Knitter.

More Simply Constructed than any Machine on the market.

Full Automatic and Interchangeable in all its parts.

A Two-Color Striper, also Lace and Combination Lace and Stripe.

The Best and only Positive Yarn Changer on the market.

Built by

American Knitting Machine Co.

Office and Works:

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Southern Branch:
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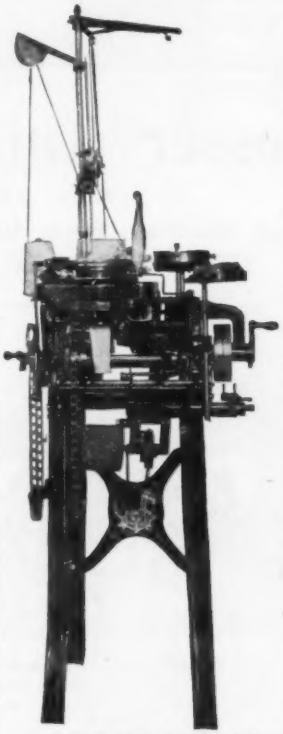
We Know How

TO BUILD HOSIERY MACHINERY

That's Why There Are More Standards



in use than any other make.

Have you seen the new Standard F?

It will produce from **30%** to **50%** more goods than any other machine on the market.

Hosiery manufacturers are invited to inspect it in our show rooms.

ARE YOU INTERESTED?

STANDARD MACHINE CO.,
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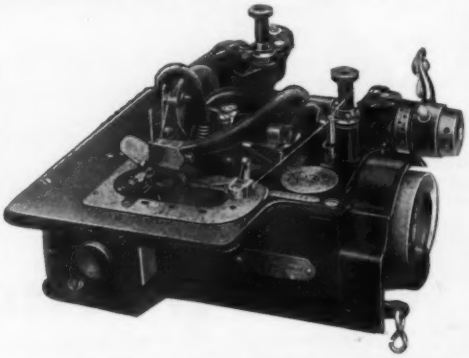
"OVERLOCK" Machine

TRADE MARK. (Pat. April 5, 1892.)

Patent twice upheld by U. S. Court of Appeals.

For Trimming, Seaming (or Hemming or Overedging) and Covering Raw Edges of Knit Underwear and Hosiery in **ONE OPERATION,** and for making "Overlock" Corded Edge on Lace Curtains, Silks, Ribbons Etc.



Extract from Report of U. S. Consul at Nottingham, Eng.

"The Overlock stitching device of Willcox & Gibbs has had a phenomenal success since the date of its introduction * * * * The keen competition among manufacturers has necessitated its use, both as a matter of economy and to improve the character of output for a discriminating market."

TRADE MARK.

Business Est. 1859.

WILLCOX & GIBBS SEWING MACHINE COMPANY

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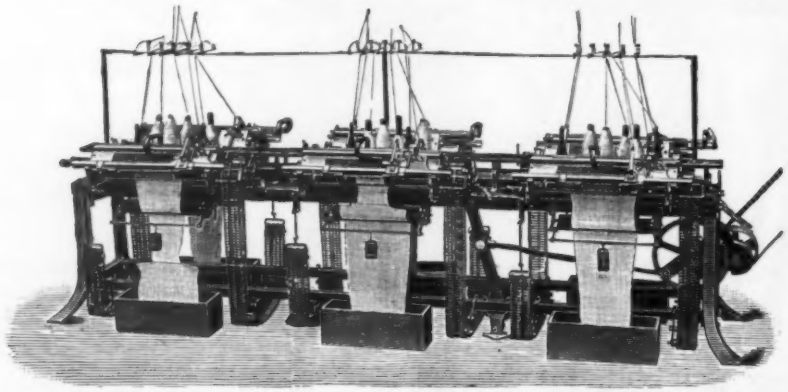
Branches: LONDON PARIS MILAN DRESDEN

The Grosser Knitting Machine Co.

MAX NYDEGGER,

Wool Exchange Building, Room 400, 260 W. Broadway, NEW YORK.



Original Grosser Knitting Machines for all purposes. Hand and power motion.

Full Automatic Fashioning Machines (automatic widening) for every kind of **plain** and **ribbed** goods, seamless sleeves and legs, combinations, pants, suits, etc.

Full Automatic Sweater Machines with independent heads.

Jacquard Nop Pattern Machines, with latest improvements. Most productive. Special constructions for all kinds of knit goods. All parts interchangeable. Large stock of machines, parts, needles, etc. Call for particulars about size, gauge, prices, etc., at

GROSSER KNITTING MACHINE CO.,

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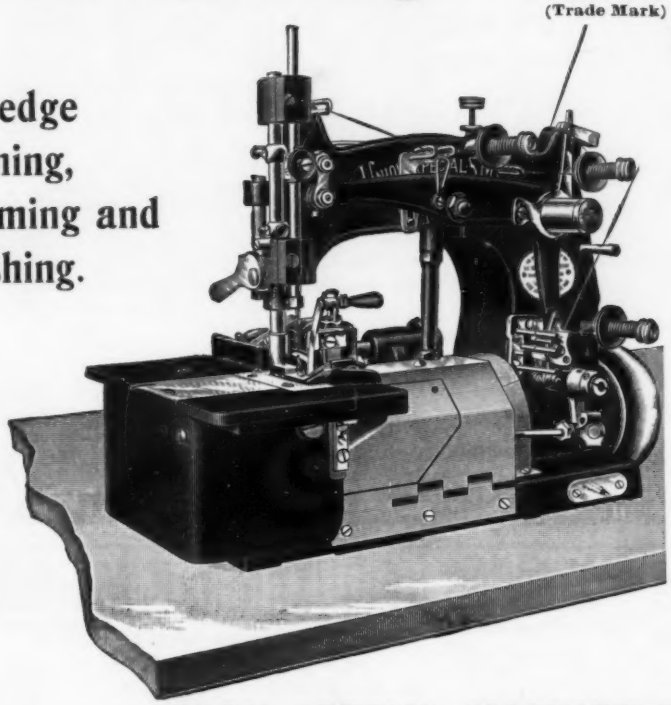
Show Room in Philadelphia, 738 No. 4th St., Frank Reichenbach, Local Agent.

High Speed and Most Durable Mechanism are the Essential Elements of Machines to Produce Sewed Articles. We have these Elements in the

New Union Special Single "Interlock" Machine

(Trade Mark)

For Overedge Seaming, Hemming and Finishing.



High Speed Class 15400.

Two or Three Thread Stitch.

Simplicity.

Durability.

UNION SPECIAL MACHINE CO.

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Repairs to Hosiery and Underwear Machines, Cylinders and Dials of every description.

FINE MACHINE WORK.

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We HARDEN all CYLINDERS and DIALS large and small.

Hegeman Seamless Bobbin Cover.

The best, cheapest and most satisfactory covering for winder bobbins. Will fit on any style or size.

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Amsterdam, N. Y.
SOLE AGENT FOR
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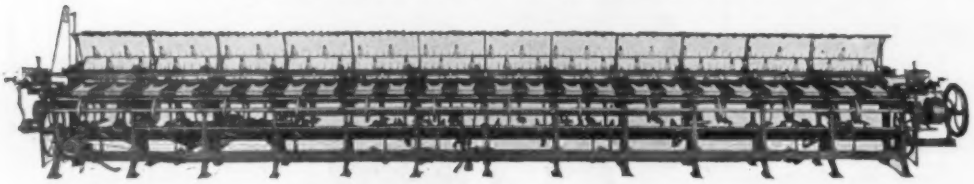
FULL-FASHIONED HOSIERY MACHINERY

.. BUILT BY ..

Chemnitzer Wirkwaaren-Maschinenfabrik

(Formerly SCHUBERT & SALZER)

CHEMNITZ, GERMANY.



HALF-HOSE LEGGER OF 24 SECTIONS.

All classes of flat work machines for full-fashioned hosiery in all gauges, from 21, 24, 27 up to 51 guage, from 12-24 sections, also machines for full-fashioned shirts and pants in all guages from 6-10 sections, with narrowing and widening.

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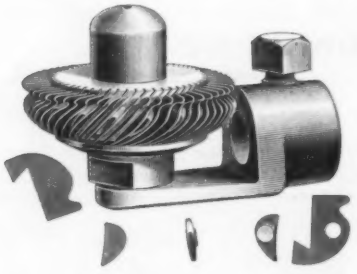
The Tompkins BACKING BURR

Saves Needles



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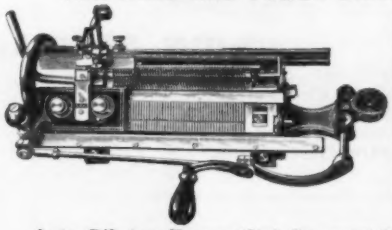
Best Knitting Machines

IMPROVED CONSTRUCTION

FOR HAND AND POWER DRIVING.



High Speed, Excellent Work-manship.

Auto. Rib-top, Fancy-stitch Jacquard Machines.

Everywhere in work. 80,000 Machines sold.

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Sole Manufacturer of the

CHAMPION HOSIERY STAMP.

PATENTED JANUARY 7, 1896.

The Only Perfect Stamp for Hosiery, Underwear and all Woven Fabrics. BLOCKS FOR PRINTING HOSIERY.

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MECHANICAL HEATING
VENTILATING & DRYING
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FANS.
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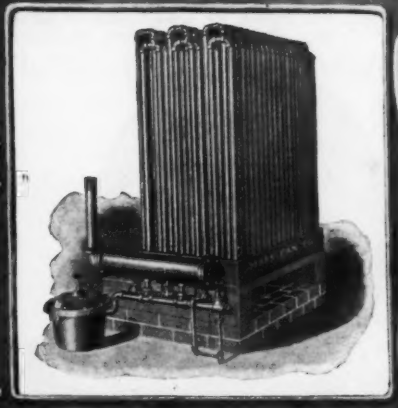

WM. COREY CO.,
Manufacturers of Knitting Machine
Latch Needles,
MANCHESTER, N. H.

EXCELSIOR NEEDLES.
The best Hosiery Needles in the market.
Manufactured by
WARDWELL NEEDLE CO., Lakeport, N. H.

W.M. BREEDON'S SON,
MANUFACTURERS OF
Spring Knitting Needles
AND BURR BLADES OF ALL KINDS.
AMSTERDAM, - N. Y.

ORION TREAT,
MANUFACTURER OF
Screw Riveted Balmoral and Double Rib
NEEDLES
(Patented May 6, 1890.)
All Work Guaranteed. MANCHESTER GREEN, CONN.

L. T. IVES CO.
Manufacturers of all kinds of
SPRING KNITTING NEEDLES
NEW BRUNSWICK, N. J.

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MANUFACTURERS OF
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of all kinds. Warranted in every respect.
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Manufacturers' Supplies Co.
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Needles and Supplies for Knitting Mills.
Agents for EXCELSIOR NEEDLE CO., and NATIONAL NEEDLE CO.

EDWIN A. NEWTON,
KNITTING MILL MACHINERY AND SUPPLIES,
NEW AND SECOND HAND.
Exclusive Agent for the Hemphill Full Automatic Knitters.
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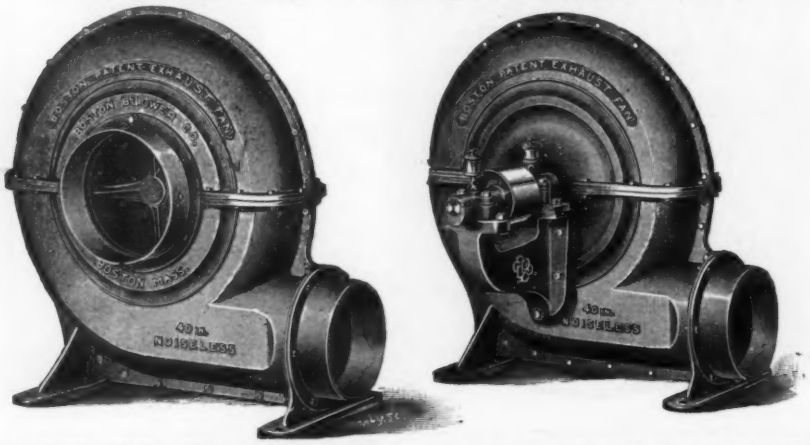
Expert Appraisals on Machinery.

CRANE MFG. CO. Lakeport, N. H.
Spring Needle Circular
KNITTING MACHINE.
For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.
A Specialty of Hardened Bladed Burr Wheels with Self-Oiling Brackets.

LACINGS FOR OVERSHIRTS and UNDERWEAR.
Tipped and Tasseled.
Hepner & Horwitz, 30 Howard St., N. Y.

Boston Wool Exhausters, with Removable Tops.

As used in Connection with Pneumatic Conveyor System for Handling Wool, Cotton, Rags, Excelsior, Jute, etc.



Inlet Side of Right-hand Wool Exhauster. **Pulley Side of Left-hand Wool Exhauster.**

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readily be removed for inspection or cleaning without disconnecting either pipe or belt connections.

BOSTON BLOWER CO., Main Office and Works: **Business and Glenwood Sts., HYDE PARK, MASS.**

Reels for Cotton WOOLEN AND WORSTED

Patented Hosiery Winders, Cop Winders and Spoolers.

LINDSAY, HYDE & CO.,

2124 to 2130 East York St., PHILADELPHIA, PA.

Water Wheel Governors

For TEXTILE MILLS

We Guarantee Satisfaction.

Replogle Governor Works

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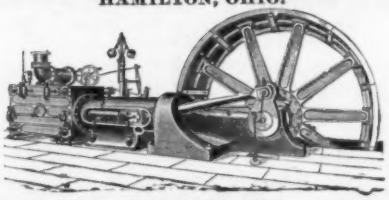
The Hooven, Owens & Rentschler Co..

HAMILTON, OHIO.



BUILDERS OF THE

Hamilton-Corliss Engine.

Simple, Compound and Condensing, of any size, for all purposes.

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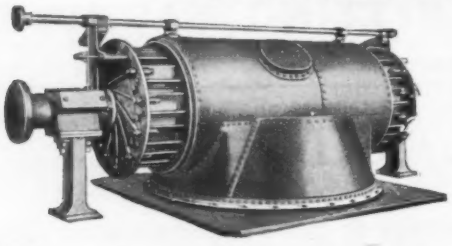
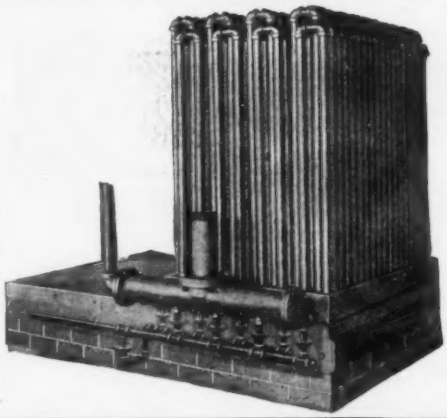
SAMSON TURBINE



AN EVEN and REGULAR SPEED under all CHANGES of LOAD is always desirable. This condition combined with a QUICK SPEED and HIGH EFFICIENCY makes a combination hard to beat. The SAMSON maintains all these conditions under the most severe tests.

Write Department A-5 for Catalogue.

The James Leffel & Co., SPRINGFIELD, OHIO, U. S. A.



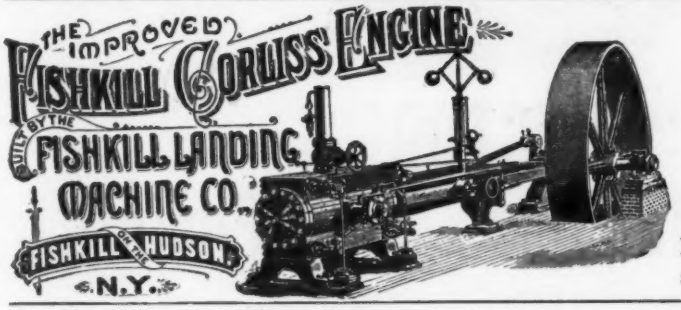
The "ABC" Fan System of Heating and Ventilating

Coils similar to those shown in the illustration are encased in a steel jacket, to which is attached a Fan or Blower to draw or force the air over the heated coils. It is then distributed by means of piping or conduits. A uniform temperature and perfect ventilation in all parts of the mill are assured.

"The Method Successful."

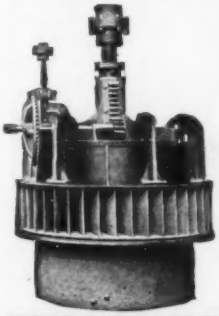
FANS AND BLOWERS FOR ALL PURPOSES.

AMERICAN BLOWER CO., DETROIT.



Most Efficient and Economical Power in the world For Textile Mills.

It has NO EQUAL for Close Regulation and Noiseless Operation. Send for Catalogue.



Risdon-Alcott Turbine Co.

MOUNT HOLLY, NEW JERSEY, U. S. A.

RISDON CELEBRATED TURBINE
ALCOTT HIGH DUTY TURBINE

On Horizontal or Vertical Shafts.

These Turbines are recognized as the most effective water wheels made. Your inquiries should come direct to us for this class of machinery.

PAIR McCORMICK TURBINES

4,000 H.P., 72 ft. head, arranged to drive generator and a single turbine to drive exciter. Five settings built for the Hudson River Water Power Company's Spier Falls plant and 14 pairs 51 inch for their plant at Mechanicsville, N, Y.

Write for Catalogue if contemplating purchase of turbines.

S. MORGAN SMITH CO.
YORK, PA.
Boston Office, 176 Federal Street.

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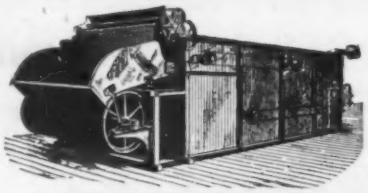
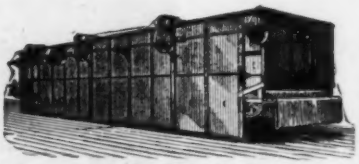


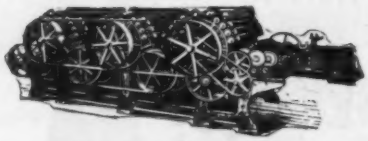
Automatic Cotton Stock Dryer.



Automatic Yarn Dryer.

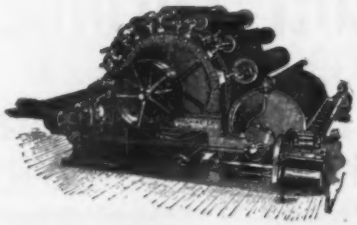
"CYCLONE" DRYERS

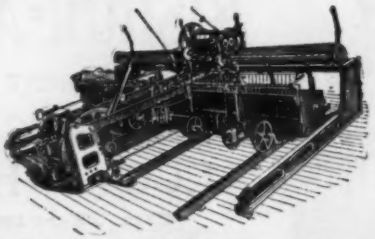
For Cotton Stock, Wool Stock, Rags,
Yarn, Cloth, Underwear, Stockings, Etc.



"PROCTOR"
Garnett Machines and Pickers

For reducing to fibre Cotton and Woolen
Waste, Cloth Clippings, Etc.





"FURBUSH" Woolen Mill Machinery

Including Pickers, Cards, Mules, Twisters,
Warpers, Dressers, Spoolers, Etc.

Manufactured by

THE PHILADELPHIA TEXTILE MACHINERY CO.,
Hancock and Somerset Sts., - PHILADELPHIA, PA.

Talks to Textile Manufacturers

CHAPTER VIII

If Silk Manufacturers Knew

how badly the consumers in this country needed a silk education, and how much more liberal purchasers they would be if they had a silk education, how easy it would be for these silk manufacturers to give them this silk education. The magazines of to-day would carry as much domestic silk advertising as they do of carpets or upholstery goods, or any other textile whose makers have already begun to wake up.

My experience with manufacturers of other textiles who have advertised, as well as those who have not advertised, would be very valuable to any silk manufacturer who cares either to increase the amount of his business or to safeguard the amount that he already has.

This information, which is full and complete, is free to any who are sufficiently in earnest to ask for it.

THOMAS BALMER, Advertising Manager

The Butterick Trio

THE DELINEATOR—THE DESIGNER—NEW IDEA WOMAN'S MAGAZINE

Butterick Building, NEW YORK

JAMES SMITH WOOLEN MACHINERY CO.

411 to 421 Race Street, Philadelphia.

Woolen Machinery

FOR

Carding, Spinning, Wool Washing, Carnetting, Pickering, Drying, Burring, Cleaning, Finishing.

Cotton Batting and Waste Machinery.

FOR MORE COMPLETE LINE SEE PAGE 59.

BUFFALO DISK WHEELS

For Cooling, Ventilating, Drying.

Types: PULLEY, STEAM, ELECTRIC.

For Removing Steam from Slashers and Dye-Houses as well as all offensive odors common to dyeing processes. They are largely and successfully employed in cotton, linen and woolen mills for such purposes as well as for preventing harmful condensation of steam in the room.

BUFFALO FORGE COMPANY, Buffalo, N. Y.

NEW FOSTER CONE.

Open wind from start to finish of Cone.

No press-offs from knots, over-winds, etc.

The only perfect system of winding yarn for knitting purposes.

Over 30,000 spindles in use in the U. S.

FOSTER MACHINE CO.,
Westfield, Mass.

Walworth Manufacturing Co.,

HIGH PRESSURE

VALVES AND FITTINGS

"Walmanco" Pipe Flanges,
"Never Stick" Blow-off Cocks, Mill Supplies.

GENERAL OFFICES:

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New York Office: Park Row Building.